5-3895-334-15

TM 5-3895-334-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

PERATOR, ORGANIZATIONAL, DIRECT SUPPORT,
GENERAL SUPPORT, AND DEPOT
MAINTENANCE MANUAL

KETTLE, HEATING, BITUMINOUS, GASOLINE ENGINE, WHEEL MOUNTED, 2 PNEUMATIC TIRES, 165-GALLON CAPACITY (WHITE MFG. MODEL F3M-1) FSN 3895-442-9741

This copy is a reprint which includes current pages from Changes 1 and 3.

HEADQUARTERS, DEPARTMENT OF THE ARMY
APRIL 1970

D 101.11:

SAFETY PRECAUTIONS

Do not use a lifting device of less than a 2,000-pound capacity. Do not allow the heating kettle to swing back and forth when it is suspended. Failure to observe this warning can result in damage to the equipment and severe injury or death to personnel.

Always release the pressure from the burner fuel tank before attempting to remove the cap. Keep head away from cap when releasing pressure. Do not use a carbon tetrachloride-type fire extinguisher or water to extinguish a bitumen liquid fire. Failure to observe this warning will cause explosions injurious to personnel.

Always provide a metal-to-metal contact between the fuel container and the engine fuel tank when replenishing the fuel supply. This will prevent a spark from being generated as the fuel flows over the metal surface.

Do not fill the engine fuel tank while the engine is in operation. Gasoline spilled on a hot engine may ignite and explode, causing serious injury to personnel.

Do not attempt repairs on the power spray system while the engine is in operation.

Do not operate the heating kettle with the melting tank cover open during rain. Water contact with bitumen near or at operating temperature will cause explosions injurious to personnel.

Changes in Force: C1 and C3

TM 5-3895-334-15
*C 3

Change No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C., *17 September 1973*

Operator, Organizational, Direct Support General Support, and Depot Maintenance Manual
KETTLE, HEATING, BITUMINOUS: GASOLINE ENGINE; WHEEL MOUNTED, 2 PNEUMATIC TIRES; 165-GALLON CAPACITY (WHITE MFG. MODEL F3M-1) FSN 3895-442-9741

TM 5-3895-334-15, 29 April 1970 is changed as follows:

Inside Front Cover "FSN 4210-984-5270" is changed to read "FSN 4210-889-2221."

Page i. Appendix B title is changed as follows: "BASIC ISSUE ITEM LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED."

Page 2-1. Paragraph 2-2 is superseded as follows:

2-2. Installation of Separately Packed Parts and Accessories

a. The following items have been removed prior to shipment and are packed inside the kettle. Install as shown by Figure 2-1.

(1) Drawoff valve
(2) Thermometer
(3) Torch
(4) Burner cleaning wire
(5) Valve wrench
(6) Manual burner fuel hose
(7) Pressure gauge
(8) Safety valve
(9) Burner handle
(10) Starter rope
(11) Spray bar assembly with 2 pieces
(12) pray bar house assembly, 15 ft lg

b. The fire extinguisher will be installed as follows:

(1) Bolt the fire extinguisher bracket to the mounting plate located on the left front side of the kettle (observed from the towed end). Three (3) *10 machine screws 1 inch long with nuts and lockwashers are required for mounting.

(2) Place fire extinguisher in the bracket and fasten clamp.

Page B-1. Appendix B, Basic Issue Items List is superseded as follows:

APPENDIX B
BASIC ISSUE ITEM LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED

Section I. INTRODUCTION

B-1. Scope

This appendix lists basic issue items, items troop installed or authorized which accompany the bitumen heating kettle and are required by the crew/operator for operation, installation, or operator's maintenance.

*This change supersedes C2, 23 November 1971.

B-2. General

This basic issue items, items troop installed or authorized list is divided into the following sections:

a. Basic Issue Items List—Section II. A list, in alphabetical sequence, of items which are furnished with and which must be turned in with the end item.

b. Items Troop Installed or Authorized List — Section III. A list, in alphabetical sequence of items which at the descretion of the unit commander may accompany the end item, but are NOT subject to be turned in with the end item.

B-3. Explanation of Columns

The following provides an explanation of columns in the tabular list of Basic Issue Items List, Section II, and Items Troop Installed or Authorized, Section III.

a. Source, Maintenance and Recoverability Code (s)(SMR):

(1) Source code, indicates the source for the listed item, Source codes are:

Code	Explanation
P	Repair parts, special tools and test equipment supplied from GSA/DSA Or Army supply system and authorized for use at indicated maintenance levels.
P2	Repair parts, special tools and test equipment which are procured and stocked for insurance purposes because the combat or military essentiality of the end item dictates that a minimum quantity be available in the supply system.

(2) Maintenance code, indicates the lowest level of maintenance authorized to install the listed item. The maintenance level code is:

Code	Explanation
C	Crew/Operator

(3) Recoverability code, indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are nonrecoverable. Recoverability codes are:

Code	Explanation
R	Applied to repair parts (assemblies and components), special tools and test equipment which are considered economically reparable at direct and general support maintenance levels.
S	Repair parts, special tools, test equipment and assemblies which are economically reparable at DSU and GSU activities and which are normally furnished by supply on an exchange basis.

b. Federal stock Number. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the Federal item name and any additional description of the item required.

d. Unit of Measure (U/M). A 2-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based e.g., ft, ea, pr, etc.

e. Quantity Furnished with Equipment (BIIL Only). This column indicates the quantity of an item furnished with the equipment.

f. Quantity Authorized (Items Troop Installed or Authorized Only). This column indicates the quantity of the item authorized to be used with the equipment.

g. Illustration (BIIL Only). This column is divided as follows:

(1) Figure Number. Indicates the figure number of the illustration in which the item is shown.

(2) Item Number. Indicates the callout number used to reference the item in the illustration.

Section II. BASIC ISSUE ITEMS LIST

(1) SMR Code	(2) Federal stock number	(3) Description Ref No. & mfr code / Usable on code	(4) Unit of meas.	(5) Qty Furn with equip	(6) Illustration (a) Figure No.	(6) Illustration (b) Item No.
PC	4530-478-8073	CLEANER, JET BURNER	EA	1		
PC	4530-478-8074	TORCH, BURNER LIGHTER	EA	1		

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) SMR code	(2) Federal stock number	(3) Description Ref. No. & Mfr code	Usable on code	(4) Unit of meas	(5) Qty auth
	4210-889-2221	EXTINGUISHER, FIRE		EA	1
	5120-264-3793	WRENCH, ADJUSTABLE		EA	1
	5120-277-1461	WRENCH, PIPE		EA	1
	5120-262-8486	WRENCH, BUNG		EA	1
	8415-427-5003	GLOVES, CLOTH ASBESTOS		PR	1

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-25B (qty rqr block No. 422) organizational maintenance requirements for Heaters, Bituminous.

TECHNICAL MANUAL
No. 5-3895-334-15

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 27 August 1971

Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual

KETTLE, HEATING, BITUMINOUS, GASOLINE ENGINE, WHEEL MOUNTED, 2 PNEUMATIC TIRES, 165-GALLON CAPACITY (WHITE MFG. MODEL F3M-1) FSN 3895-442-9741

TM 5-3895-334-15, 29 April 1970, is changed as follows:

Inside front cover. Add: "Do not tow the kettle with the melt tank cover open. Vehicle motion can cause bitumen to splash out and burn personnel in the immediate vicinity." "Do not operate this equipment unless fire extinguisher, FSN 4210-984-5270, or equivalent is readily available at all times."

Page 2-9. After paragraph 2-11*a*(6), add:

"CAUTION

Do not operate this equipment unless fire extinguisher, FSN 4210-257-5343, or equivalent is readily available at all times."

Page 2-12. After paragraph 2-11*c*(4), add:

"WARNING

Do not tow kettle with the melt tank cover open. Vehicle motion can cause bitumen to splash out and burn personnel in the immediate vicinity."

Page 2-12, figure 2-6; add the following:

"NOTE

Both valves should be in center position."

Page 2-31, figure 2-6; add the following:

"NOTE

Upper valve should be in far left position, lower valve in center position."

Page 2-14, figure 2-6; add the following:

"NOTE

Upper valve should be in center position, lower valve in far left position."

Page 2-15, figure 2-6; add the following:

"NOTE

Both valves should be in far left position."

Page 3-9, figure 3-1 is superseded as follows:

1. Nut
2. Lockwasher
3. Capscrew
4. Capscrew
5. Lockwasher
6. Clamp
7. Clamp
8. Clamp
9. Engine
10. Fuel line
11. Nut
12. Lockwasher
13. Brace
14. Nut
15. Lockwasher
16. Vibration mount
17. Capscrew
18. Mount
19. Nut
20. Lockwasher
21. Nut
22. Lockwasher
23. Flat washer
24. Vibration mount
25. Capscrew
26. Bracket
27. Elbow
28. Nipple
29. Nut
30. Lockwasher
31. Capscrew
32. Flatwasher
33. Strap
34. Fuel tank
35. Tank attaching strip
36. Cap
37. Elbow

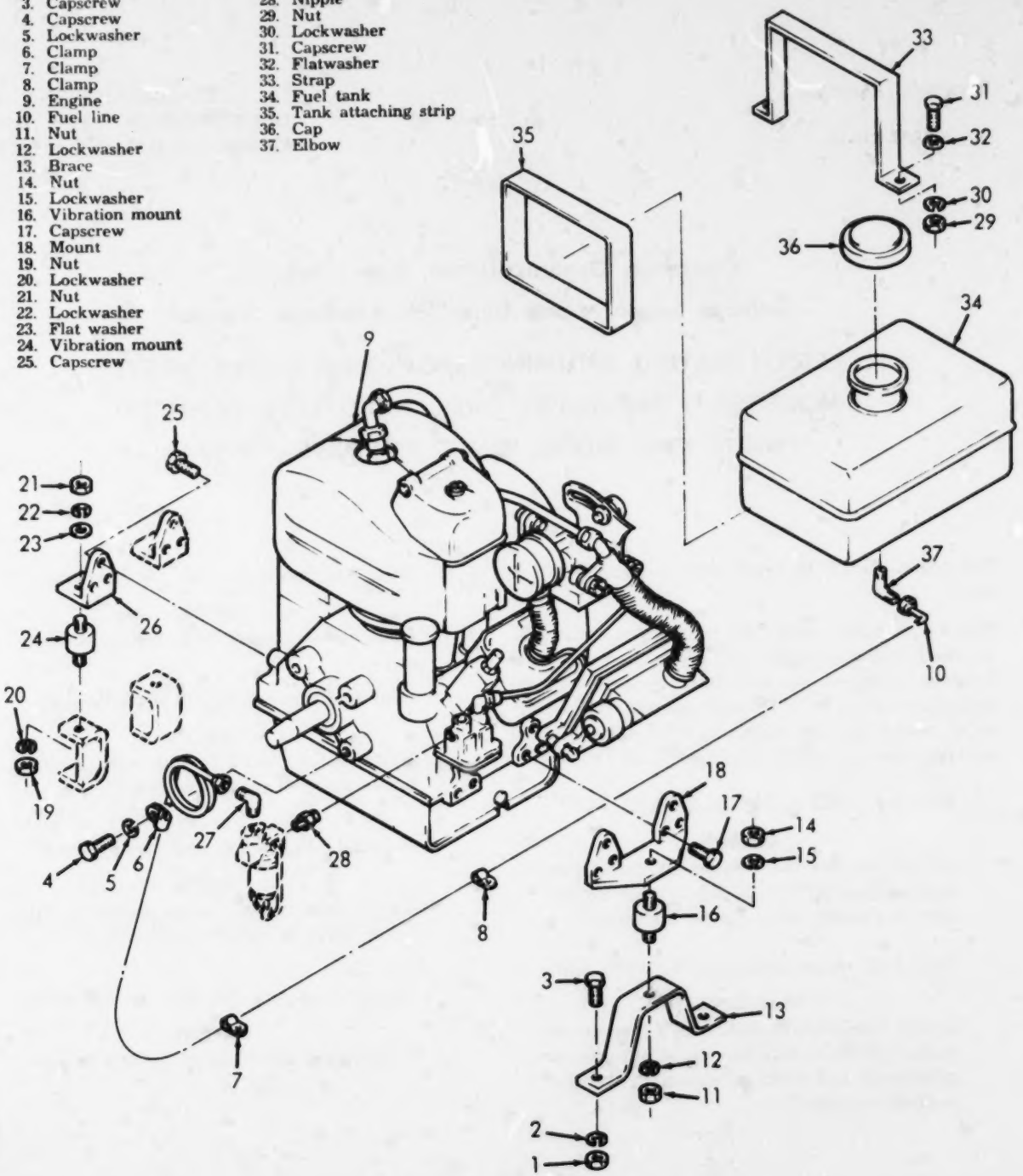
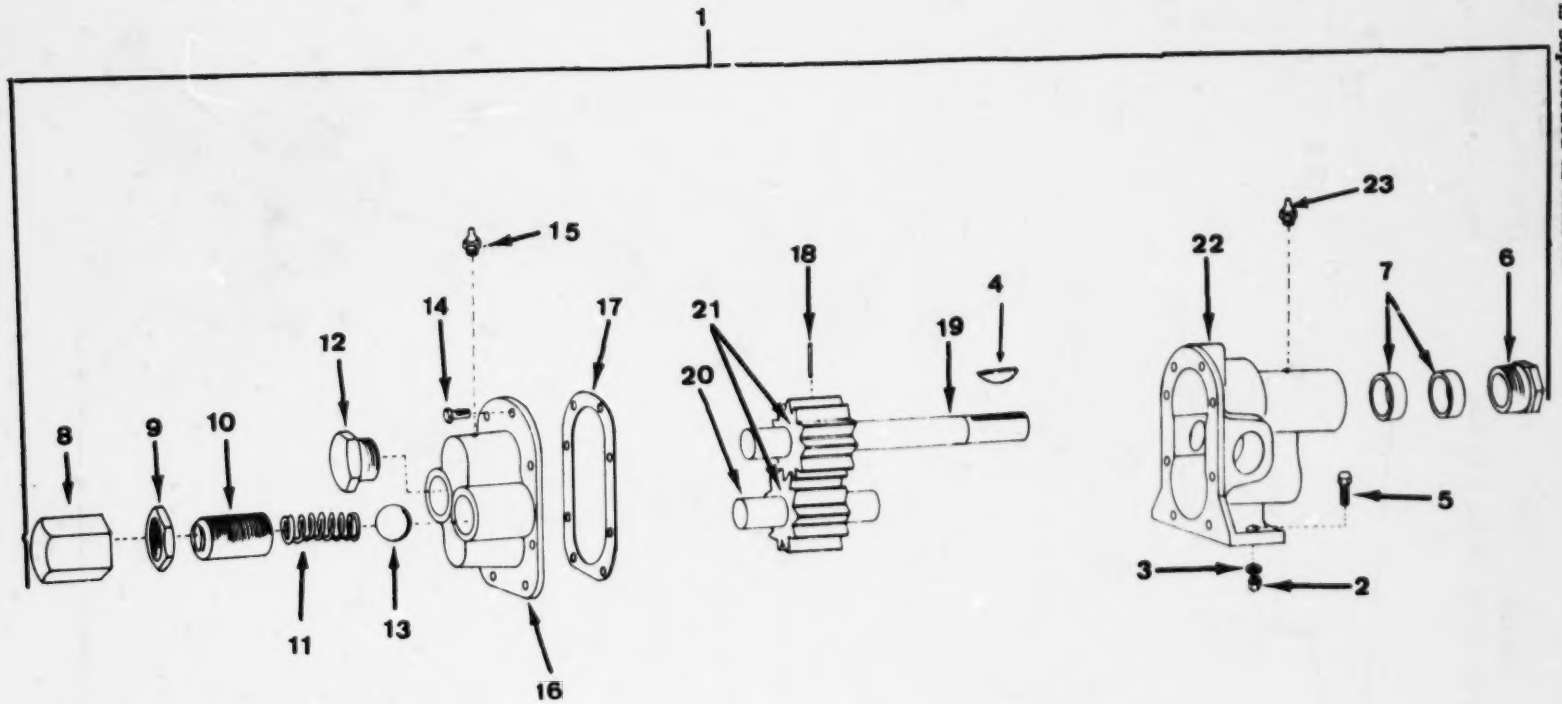


Figure 3-1. Fuel system and engine removal and installation

ME 3895-334-15/3-1 C1

Page 3-28, figure 3-16 is superseded as follows:



1. Bitumen pump
2. Nut
3. Lockwasher
4. Key
5. Capscrew
6. Packing nut
7. Packing ring (2)
8. Bypass nut
9. Locknut
10. Adjusting screw
11. Bypass spring valve
12. Bypass plug nut
13. Steel ball
14. Cover screw
15. Lubricating fitting
16. Cover
17. Gasket
18. Gear to shaft pin
19. Drive shaft
20. Idler shaft
21. Pump gear
22. Pump body
23. Lubrication fitting

Figure 3-16. Pump disassembly and reassembly

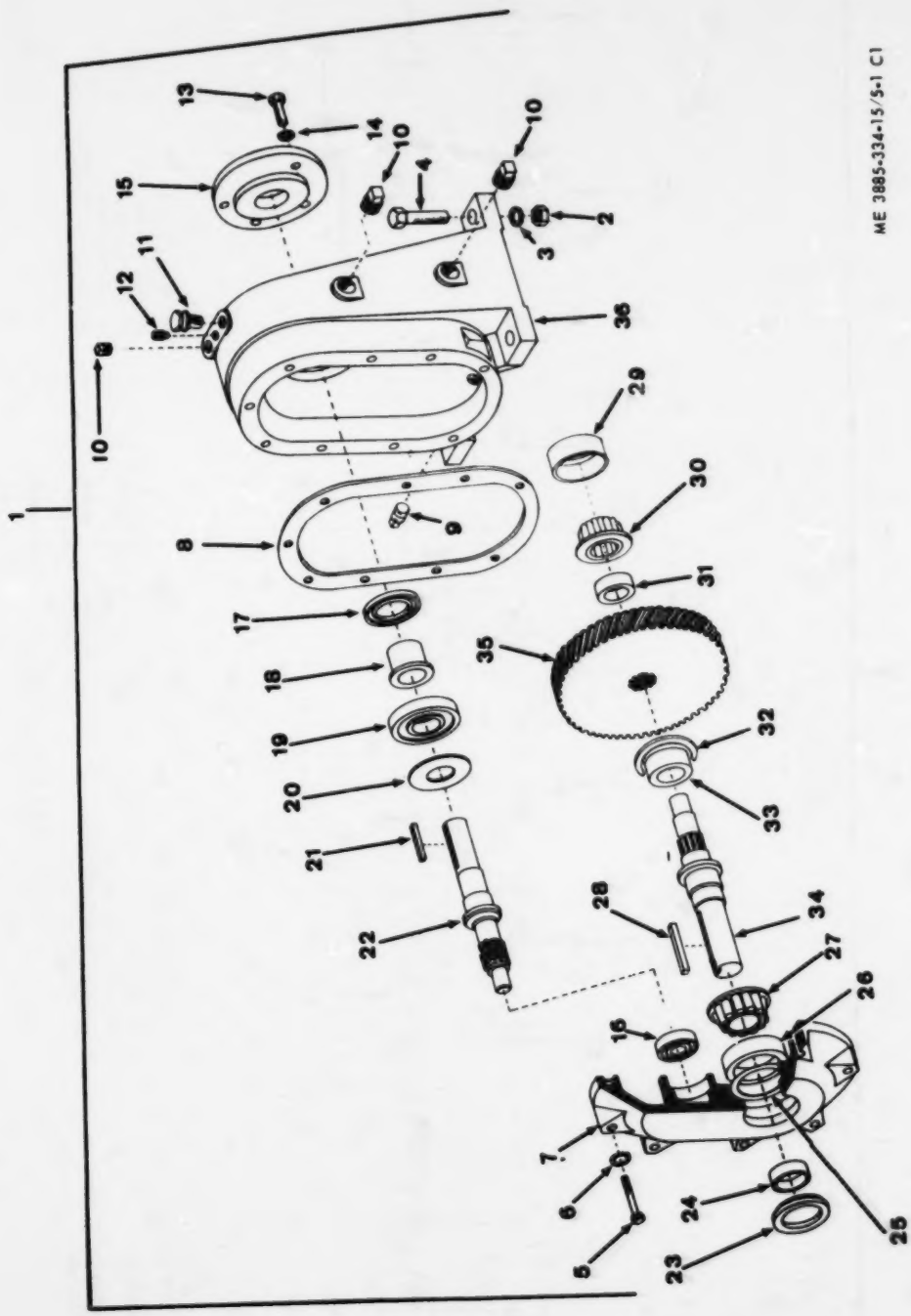
ME 3895-334-15/3-16 C1

Page 5-2. After paragraph 5-12, add the following:

"NOTE

Remove input seal sleeve (18 fig. 5-1) and outer input shaft bearing (16) from input with pinion shaft (22) with an arbor press. Do not use hammer."

Page 5-3, figure 5-1 is superseded as follows:



1. Gear reducer assembly
2. Nut
3. Lockwasher
4. Capscrew
5. Capscrew
6. Lockwasher
7. Bearing housing
8. Gasket
9. Plug
10. Plug
11. Vent plug
12. Plug
13. Capscrew
14. Lockwasher
15. Clamp
16. Outer Input shaft bearing
17. Input shaft oil seal
18. Input shaft seal sleeve
19. Inner input shaft bearing
20. Slinger
21. Input shaft key
22. Pinion shaft
23. Output shaft oil seal
24. Output shaft seal sleeve
25. Shim
26. Bearing cup
27. Cone bearing
28. Output shaft key
29. Bearing cup
30. Cone bearing
31. Gear spacer
32. Lock ring
33. Spacer
34. Output shaft
35. Output gear
36. Gear case

Figure 5-1. Gear reducer disassembly and reassembly

Page 5-4. Paragraph 5-20. Change the figure reference in line 3, to read figure "5-2". Add the following:.

"NOTE

Use a suitable puller to remove hub (32, fig. 5-2) from output shaft (34, fig. 5-1). Installation of these items requires an arbor press."

Page B-2. Section II is superseded as follows:

Section II. BASIC ISSUE ITEMS

(1) SMR Code	(2) Federal stock No.	(3) Description: Ref No. & Mfr Code / Usable on code	(4) Unit of meas	(5) Qty inc in unit	(6) Qty furn with equip	(7) Illustration: (A) Fig No.	(7) Illustration: (B) Item No.
		GROUP 01 ACCESSORIES					
PC	7510-889-3494	BINDER, looseleaf	ea		1		
PC	7520-559-9618	CASE, operator and maintenance publications	ea		1		
PC	4530-478-8073	CLEANER, jet burner TK-002 (03742)	ea		1		
PC	4530-478-8074	TORCH, burner lighter TK-166B (03742)	ea		1		
		GROUP 02—PUBLICATIONS ARMY TECHNICAL MANUAL					
		TM 5-2805-256-14	ea		1		
		TM 5-3895-334-15	ea		1		
		ARMY LUBRICATION ORDER					
		LO 5-2805-256-12	ea		1		
		LO 5-3895-334-12	ea		1		

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

VERNE L. BOWERS,
Major General, United States Army,
The Adjutant General.

Distribution:

To be distributed in accordance with DA Form 12-25 (qty rqr block No. 421) operator maintenance requirements for Heaters, Bituminous.

Technical Manual
No. 5-3895-334-15

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *29 April 1970*

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE MANUAL

KETTLE, HEATING, BITUMINOUS, GASOLINE ENGINE, WHEEL MOUNTED, 2 PNEUMATIC TIRES, 165-GALLON CAPACITY (WHITE MFG. MODEL F3M-1) FSN 3895-442-9741

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CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

a. These instructions are published for the use of the personnel to whom the Model F3M-1, Bitumen Heating Kettle is issued. They provide information on the operation, lubrication, and daily preventive maintenance services of the equipment, accessories, components, and attachments.

b. Numbers placed in parentheses on illustrations in this manual indicate quantity.

1-2. Forms and Records

a. DA Forms and records used for equipment maintenance will be only those prescribed in TM 38-750.

b. Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commanding General, U.S. Army Mobility Equipment Command, ATTN: AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120.

Section II. DESCRIPTION AND DATA

1-3. Description

a. General. Model F3M-1, Bitumen Heating Kettle (fig. 1-1 and 1-2) is a self-contained, weather-resistant, 165-gallon capacity, portable unit. It consists of a kettle system, burner system, and power spray system and is wheel mounted. The power spray system is powered by a 1-cylinder Military Standard Engine (fig. 1-2), Model 1A08-III. The unit is designed to accommodate, melt, and spray specified bituminous materials for the maintenance and repair of roads and runways. The heating kettle is equipped to receive bituminous material in either liquid or solid form.

b. Engine. For engine information, refer to TM 5-2805-256-14.

c. Kettle System. The kettle system consists of a melting tank with screen, outer shell with cover, and safety device. The melting tank screen is V-shaped and made of perforated metal which prevents lumps or foreign material from clogging the main outlet of the melting tank. The outer shell surrounds the melting tank, forming a combustion chamber between them. The cover safety device is provided to automatically close the cover in the event of a flash fire.

d. Burner System. The burner system consists of a fuel tank, two burner fuel hose assemblies, two burners and a thermostatic control. It is designed for operation on kerosene or diesel fuel. The burner fuel tank (fig. 1-1) is equipped with a hand air pump. Air pressure in the fuel tank forces fuel through both fuel line assemblies to the burners where it is vaporized, ignited, and the flames directed into the combustion chamber. One burner is manually controlled by means of a valve and equipped with a long fuel hose so that it may be removed from its mounting bracket and used as a hand torch. The other burner is equipped with thermostatic control to maintain any desired temperature within the operating range. An overtemperature safety shutoff is incorporated in the controls to bleed air pressure off of the fuel tank, thus extinguishing the flame, if the preset temperature is exceed by 15 F.

e. Power Spray System. The power spray system consists of a gear-type pump assembly, clutch assembly, gear reducer assembly, engine, and spray hose with spray bar assembly and nozzle (fig. 1-2). When the engine is operating and the clutch is engaged, the suction side of the pump assembly will draw the bitumen material from the heating kettle or out-

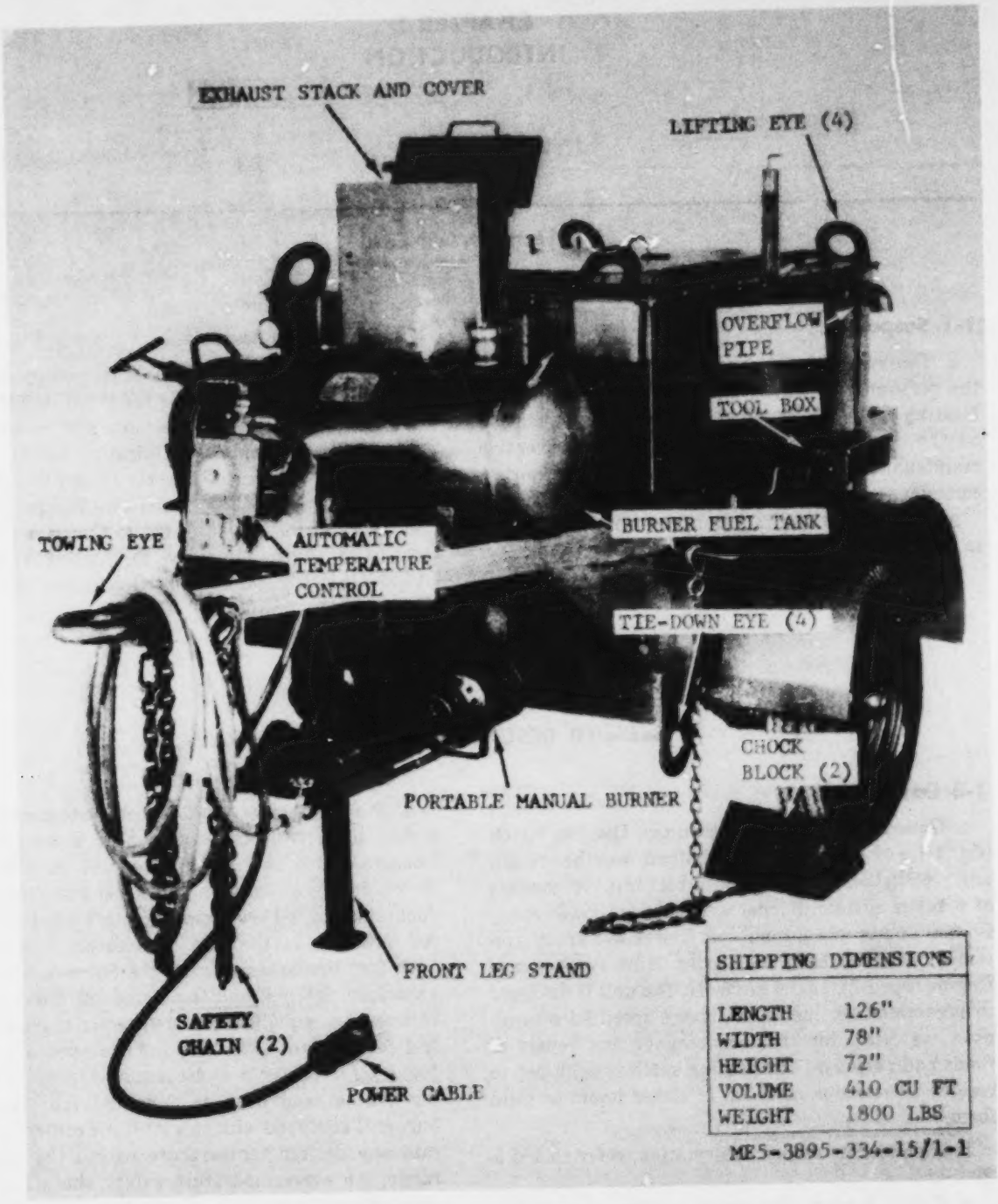


Figure 1-1. Front three-quarter view of heating kettle.

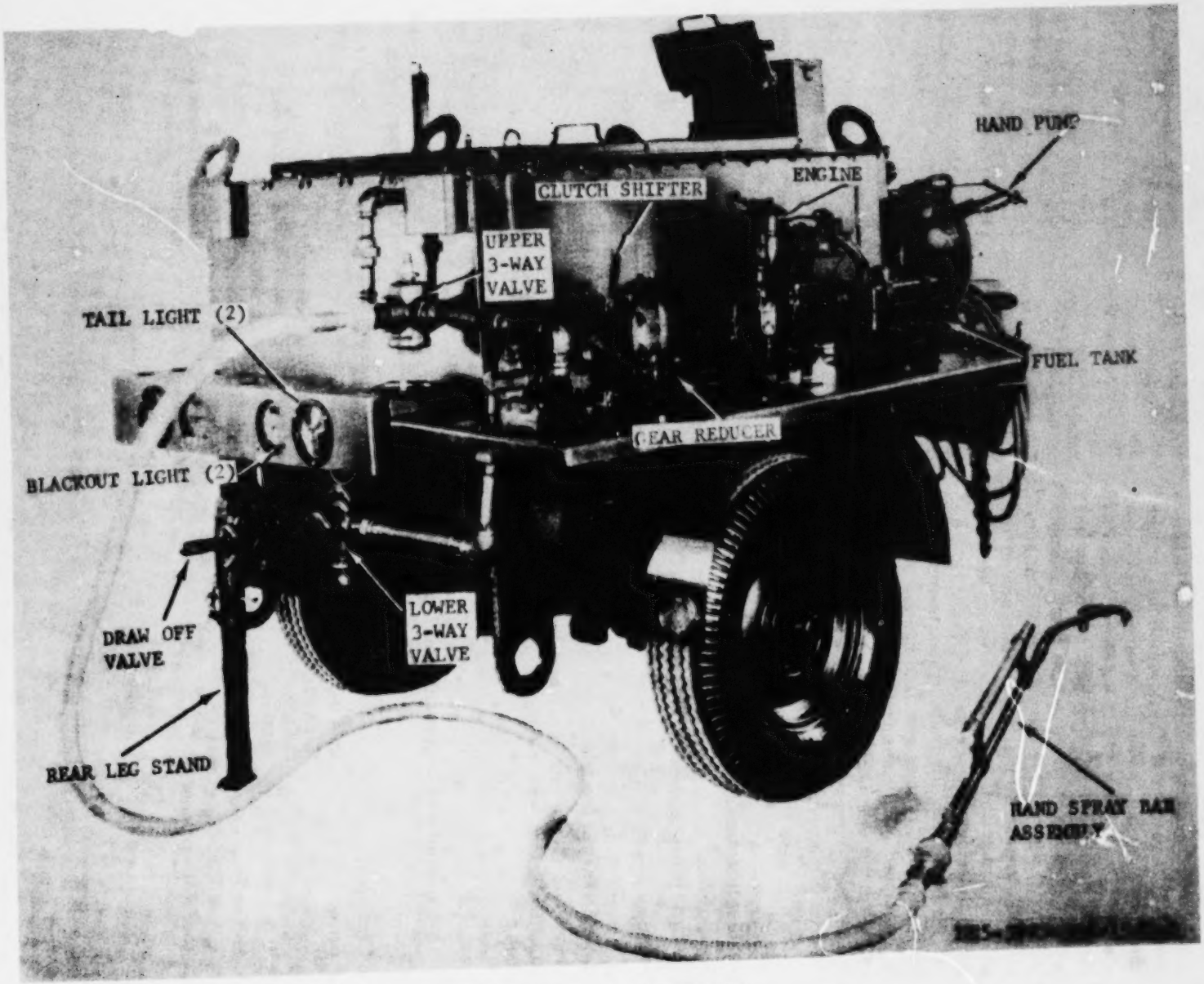


Figure 1-2. Rear three-quarter view of heating kettle.

side source, depending upon the position of the lower three-way valve (fig. 2-6). The flow continues through the pump assembly and out the discharge line to the upper three-way valve (fig. 2-6). There, it may be directed back to the melting tank or through the spray hose to the outlet nozzle. The pump assembly is equipped with a relief valve (fig. 3-17) that automatically allows material to circulate around the pump assembly when spraying operations are temporarily interrupted.

f. Trailer System. The trailer system consists of a frame assembly, running gear, and lighting system. It is equipped with tiedown eyes, lifting eyes, and towing eye (fig. 1-1) for coupling the unit to a towing vehicle. The lighting system operates when the power cable (fig. 1-1) is coupled to a power source.

1-4. Identification

The kettle has six identification plates. The data from these plates can be found in paragraph 1-6.

1-5. Difference in Models

This manual covers only the White Model F3M-1 Kettle. No known unit differences exist for this model.

1-6. Operational and Organizational Tabulated Data

a. General.

Manufacturer	White Mfg. Div. of Midwest Tank & Mfg. Co., Inc.
Model No.	F3M-1
Capacity	165 gal

b. Engine Plate. For engine plate data on model 1A08-III, see TM 5-2805-256-14.

c. Speed Reducer Plate.

Manufacturer	Dodge Manufacturing Co.
Identification No.	412630-DU
Size	SR-16A
Max input horsepower	2.23
RPM	1725
Ratio	4.13 to 1
Service factor	1.00
Torque capacity	324 in.-lbs.

d. Air Tank Plate.

Manufacturer	Midwest Tank & Mfg. Co., Inc.
National Board No.	366
Max W. P.	100 psi
Tested	200 psi
Head thickness	3/16"
Shell thickness	3/16"
Year built	1969

e. Army Identification Plate.

Nomenclature	Kettle, Heating, Bitumen, 165-gal Capacity
Model	F3M-1
Federal Stock No.	3895-442-9741
Warranty	12 months
Contract No.	DSA700-69-C-9330
Gross vehicle wt.	3000 lbs.
Shipping wt.	1800 lbs.
Length	126"
Height	72"
Width	78"
Cube	410

f. Transportation Data Plate.

Overall length	126"
Overall height	72"
Overall width	78"
Shipping cubage	410"
Shipping tonnage	11
Shipping weight	1800 lbs

g. Wiring Diagram. A wiring diagram (fig. 1-3) is provided for maintenance of the electrical system.

h. Clutch Assembly.

Manufacturer	Twin Disc Company
Model	V-1035

i. Speed Reducer Assembly.

Manufacturer	Dodge Manufacturing Corporation
Model number	SR-16A

j. Pump Assembly.

Manufacturer	Oberdorfer Foundries, Inc.
Model number	9000 BR

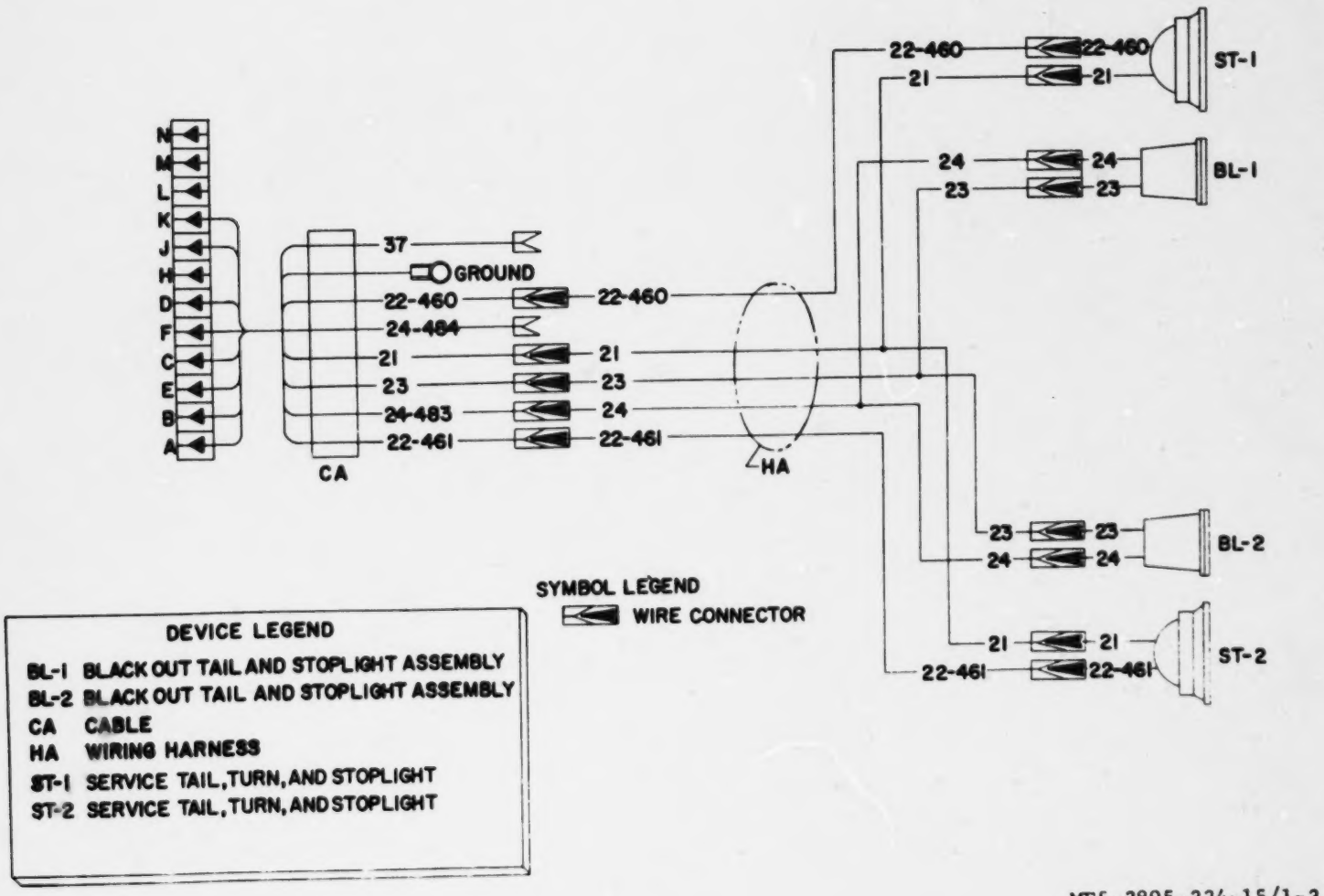


Figure 1-3. Schematic wiring diagram.

CHAPTER 2
INSTALLATION AND OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

2-1. Inspecting and Servicing Equipment

a. Remove protective covering or sealing materials from valves, tank openings, etc.

b. Remove separately packed accessories and parts from inside heating kettle.

c. Make visual inspection of the kettle and accessories for damage or missing parts.

d. Check equipment against packing list and report any discrepancies to field maintenance.

2-2. Installation of Separately Packed Parts and Accessories

The following items have been removed prior to shipment, and are packed inside the kettle. Install as shown by figure 2-1.

a. Drawoff valve.
b. Thermometer.
c. Torch.
d. Burner cleaning wire.
e. Valve wrench.
f. Manual burner fuel hose.
g. Pressure gauge.
h. Safety valve.
i. Burner handle.
j. Starter rope.
k. Spray bar assembly with 2 pieces.
l. Spray bar hose assembly, 15 ft lg.

2-3. Installation and Setting-Up Instructions

a. Lower front leg stand (fig. 1-1) and rear leg stand (fig. 1-2) and pin in place before releasing from towing vehicle, or releasing tension on lifting slings.

b. Keep kettle as level as possible during operation.

c. Chock wheels, if necessary, to prevent unintentional movement.

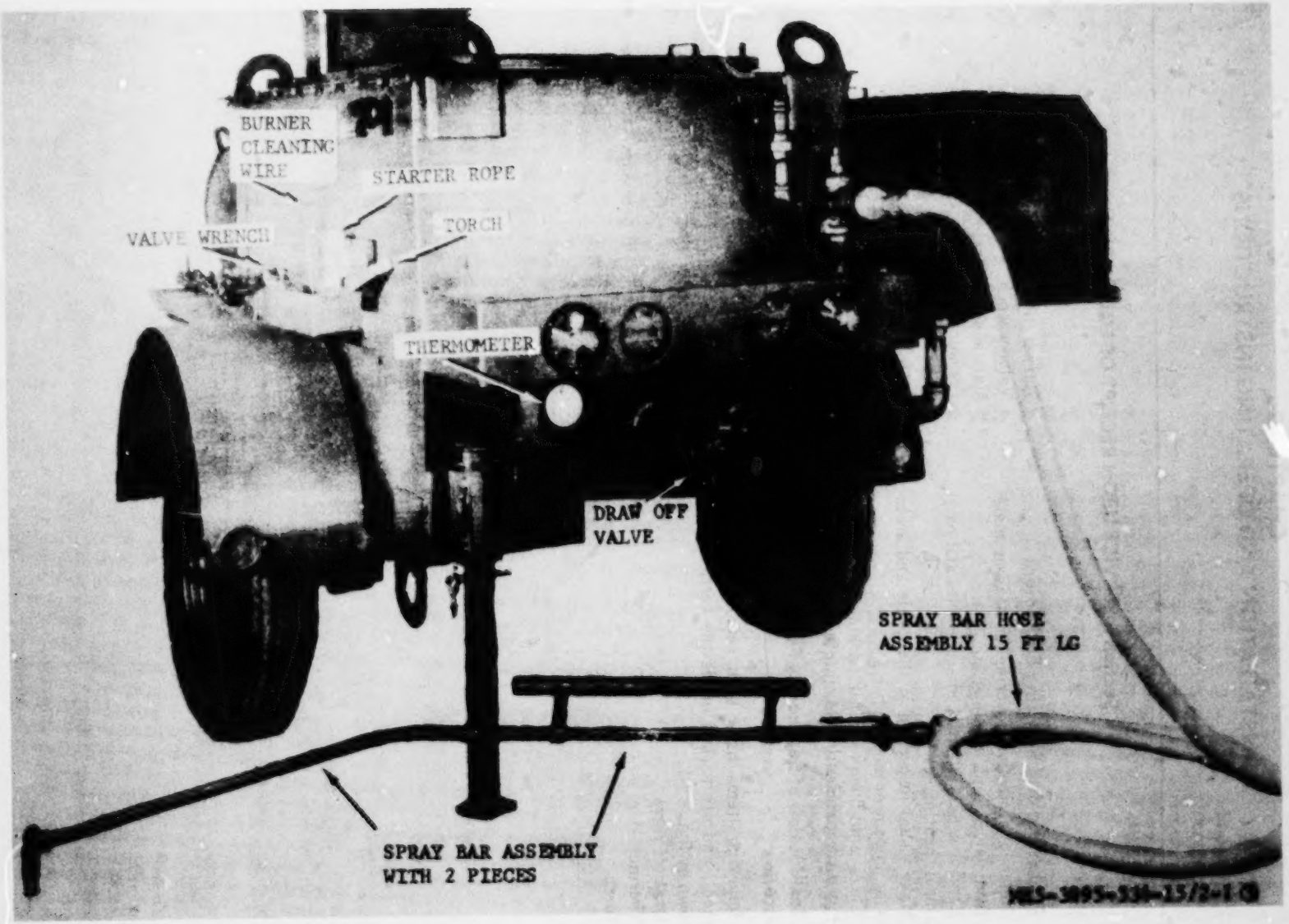


Figure 2-1. Separately packed accessories, install as shown (sheet 1 of 2).

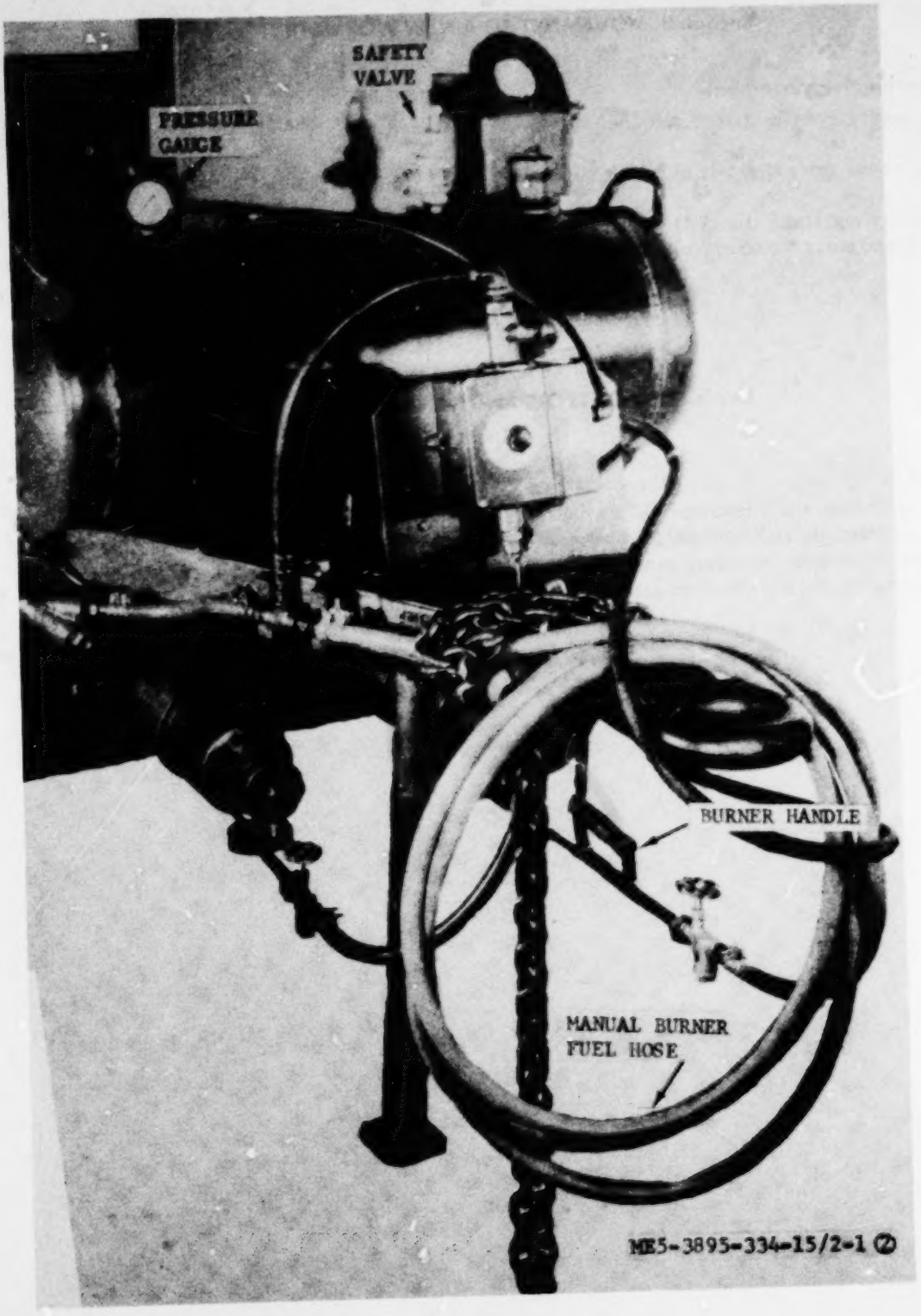


Figure 2-1. Separately packed accessories, install as shown (sheet 2 of 2).

Section II. MOVEMENT TO A NEW WORKSITE

2-4. Dismantling for movement

a. Attach towing eye (fig. 1-1) to suitable towing vehicle.

b. Connect power cable (fig. 1-1) to vehicle power receptacle.

c. Raise front leg stand (fig. 1-1) and rear leg stand (fig. 1-2) and pin in retracted position.

d. Stow chock blocks in cradles provided (fig. 1-2).

e. Attach safety chains to towing vehicle from the kettle.

2-5. Re-installation After Movement

See paragraph 2-3.

Section III. CONTROLS AND INSTRUMENTS

2-6. General

This section describes and illustrates the various controls and instruments and provides the operator with sufficient information to insure proper operation of the kettle under normal circumstances.

2-7. Controls and Instruments

Figure 2-2 illustrates and explains the function of all controls. Figure 2-3 illustrates the normal range of readings for all instruments.

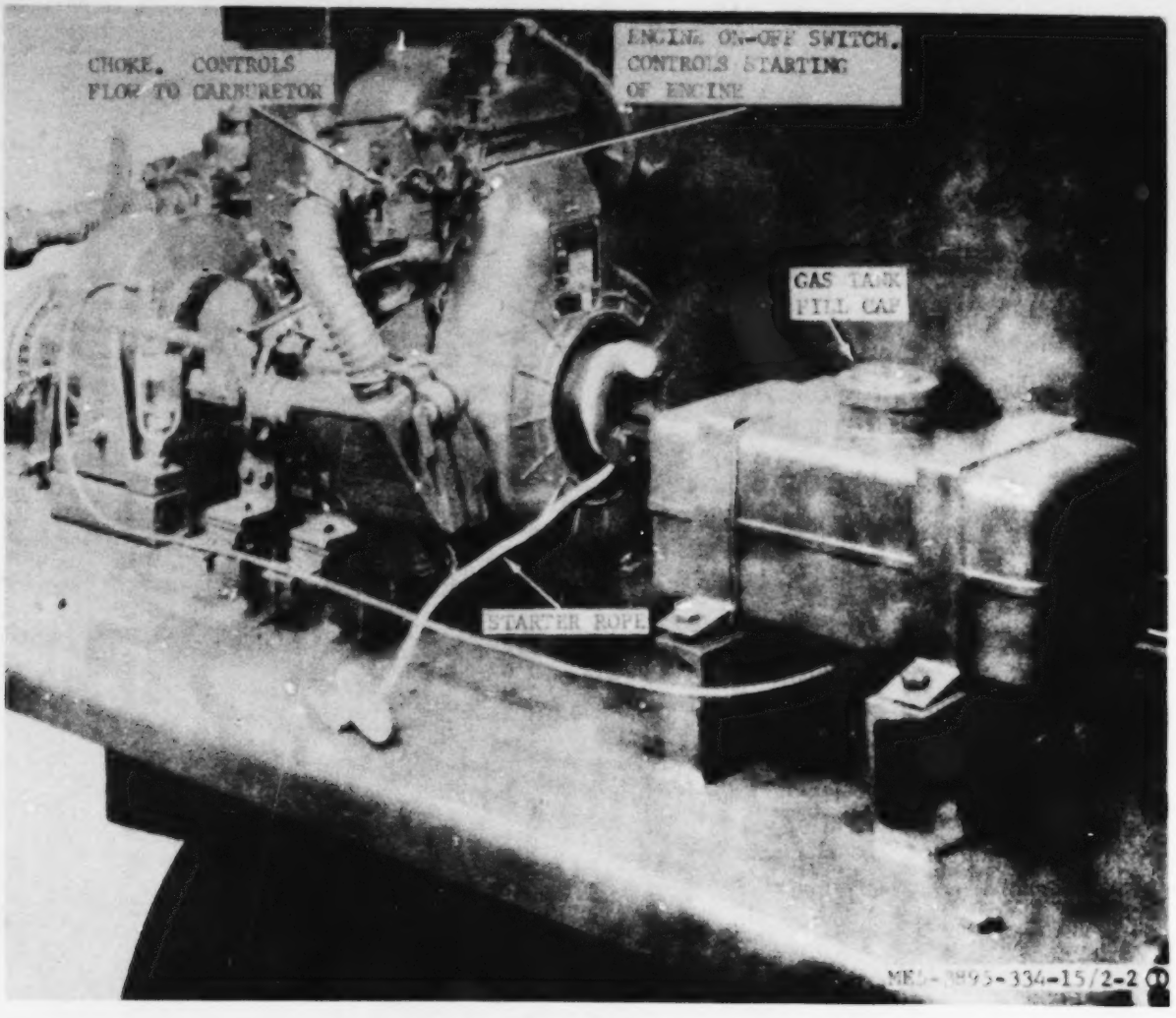


Figure 2-2. Operating controls (sheet 1 of 3).

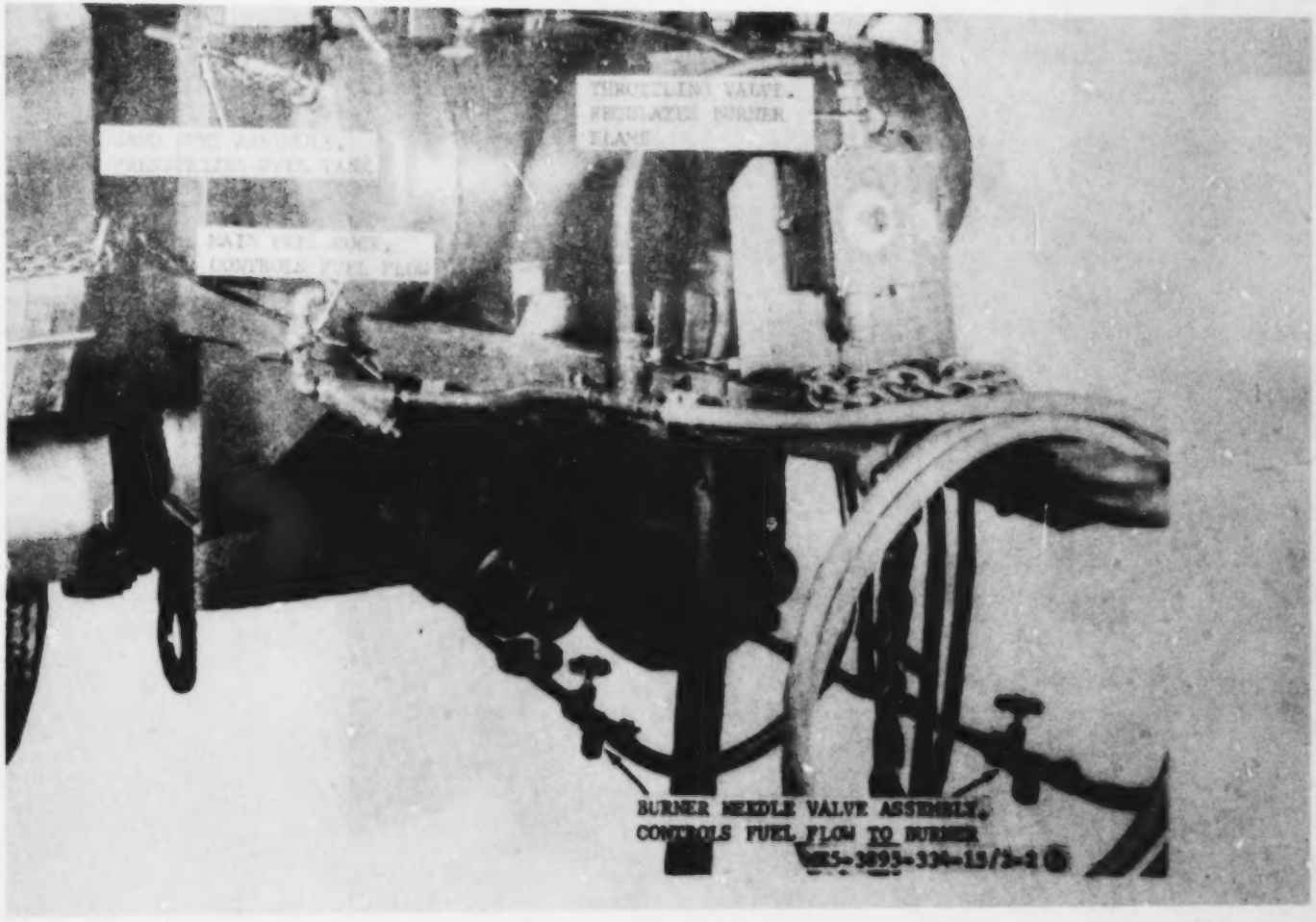


Figure 2-2. Operating controls (sheet 2 of 3).

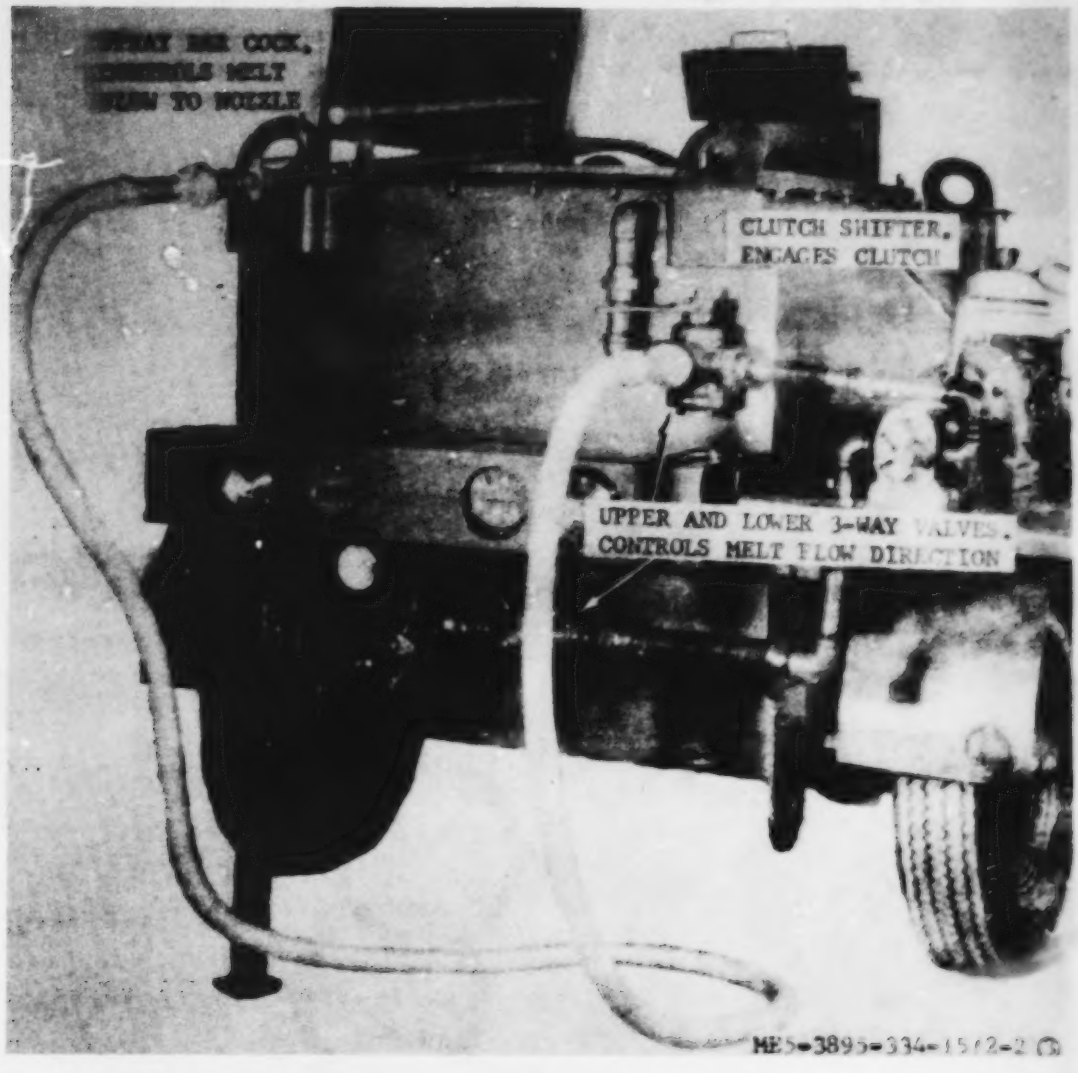


Figure 2-2. Operating controls (sheet 3 of 3).

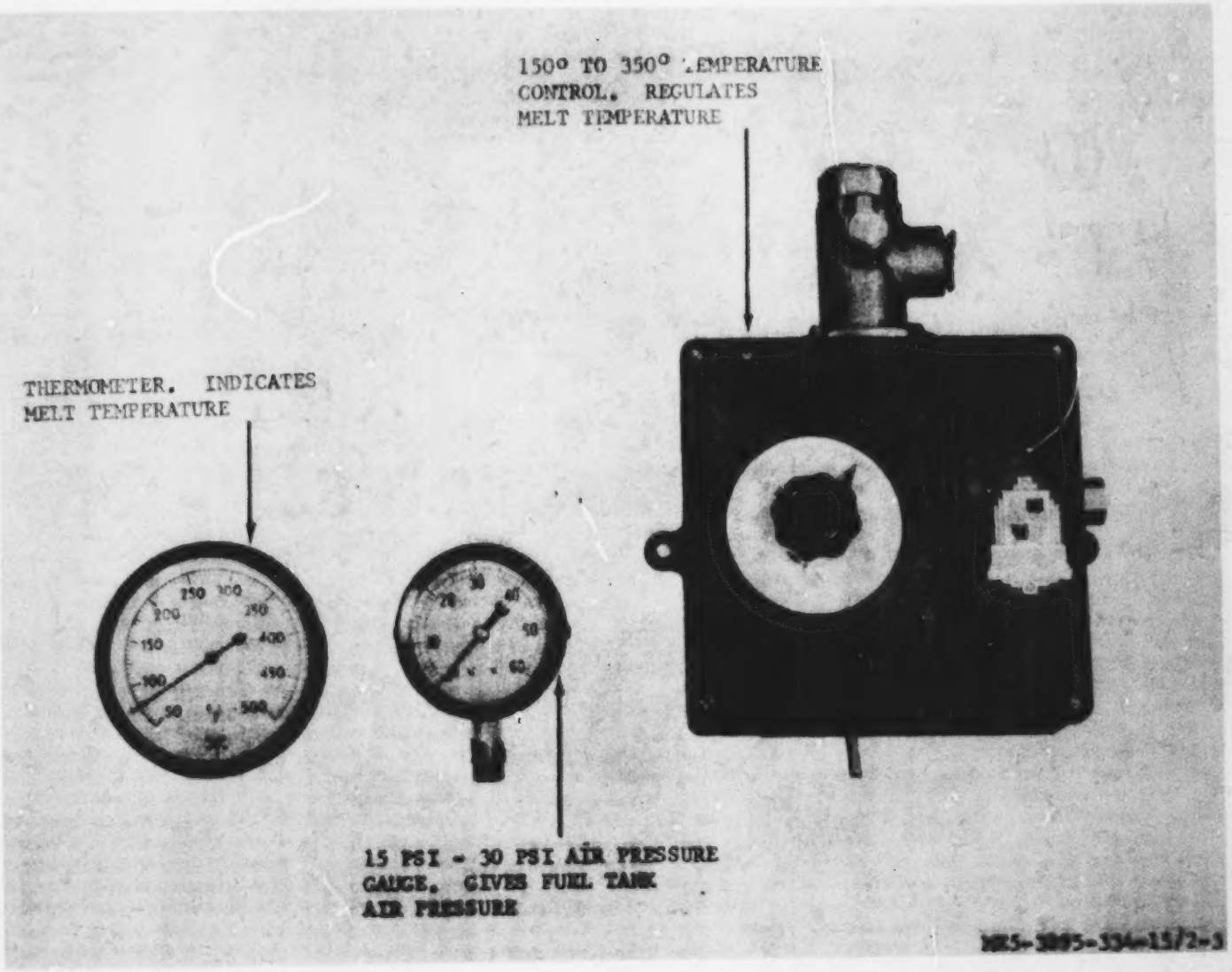

150° TO 350° TEMPERATURE CONTROL. REGULATES MELT TEMPERATURE
THERMOMETER. INDICATES MELT TEMPERATURE
15 PSI - 30 PSI AIR PRESSURE GAUGE. GIVES FUEL TANK AIR PRESSURE

Figure 2-3. Reading range of instruments.

Section IV. OPERATION UNDER USUAL CONDITIONS

2-8. General

a. The instructions in this section are published for the information and guidance of personnel responsible for operation of the heating kettle.

b. It is essential that the operator know how to perform every operation of which the heating kettle is capable. Paragraphs 2-9, 2-10, and 2-11, give instructions on starting, stopping, and operating details of the engine and heating kettle. Since nearly every job presents a different problem, the operator may have to vary the given procedure to fit the individual job.

2-9. Engine Starting Instructions

Refer to paragraph 2-11*d*(8) for engine stopping instarting instructions.

2-10. Engine Stopping Instructions

Refer to paragraph 2-11*d*:8) for engine stopping instructions.

2-11. Kettle Operating Instructions

a. Starting Instructions for Both Burners.

(1) Open stack cover (fig. 1-1). Fill burner fuel tank three-fourths full with clean kerosene or diesel fuel (kerosene preferred) (fig. 2-4).

Caution: **DO NOT FILL TANK OVER THREE-FOURTHS FULL. RESERVED SPACE IS REQUIRED FOR COMPRESSED AIR. BURNER CONTROLS WILL NOT OPERATE PROPERLY UNLESS ADEQUATE VOLUME OF COMPRESSED AIR IS AVAILABLE IN TANK.**

(2) Pressurize burner fuel tank with built-in hand pump, to approximately 25 p.s.i., then open the valve located at bottom of fuel tank (fig. 2-4).

(3) Open valve at burner, slightly, allowing fuel to fill priming cup one-quarter full. Close valve. Then, take hand torch and soak it with fuel. Now, light the satuarated torch and place it in priming cup to ignite fuel located there. Allow fuel to burn until coils are hot enough to vaporize fuel. Allow two or three minutes for vaporizing coil to heat. Priming cup may have to be refilled before coils are hot enough to vaporize fuel. When fuel is vaporized, reopen valve at burner one-eighth turn. If burner spits oil, close valve again and allow more time for gas to generate in coil.

(4) Once burner stops spitting oil, reopen valve until burner gives smooth burning performance.

Note. Maintain air pressure in fuel tank between 15 and 25 p.s.i. for best burner performance.

(5) Set thermostatic controller to desired operating temperature by turning knob located on front of the temperature controller, clockwise (fig. 2-4).

(6) If operating heat chamber temperature goes above preset temperature by 15°, the controll will automatically depressurize fuel tank and burner flame will fail. When this happens, allow material to cool until it drops back past pre-set temperature. Then, repeat steps (1) thru (5) as may be required.

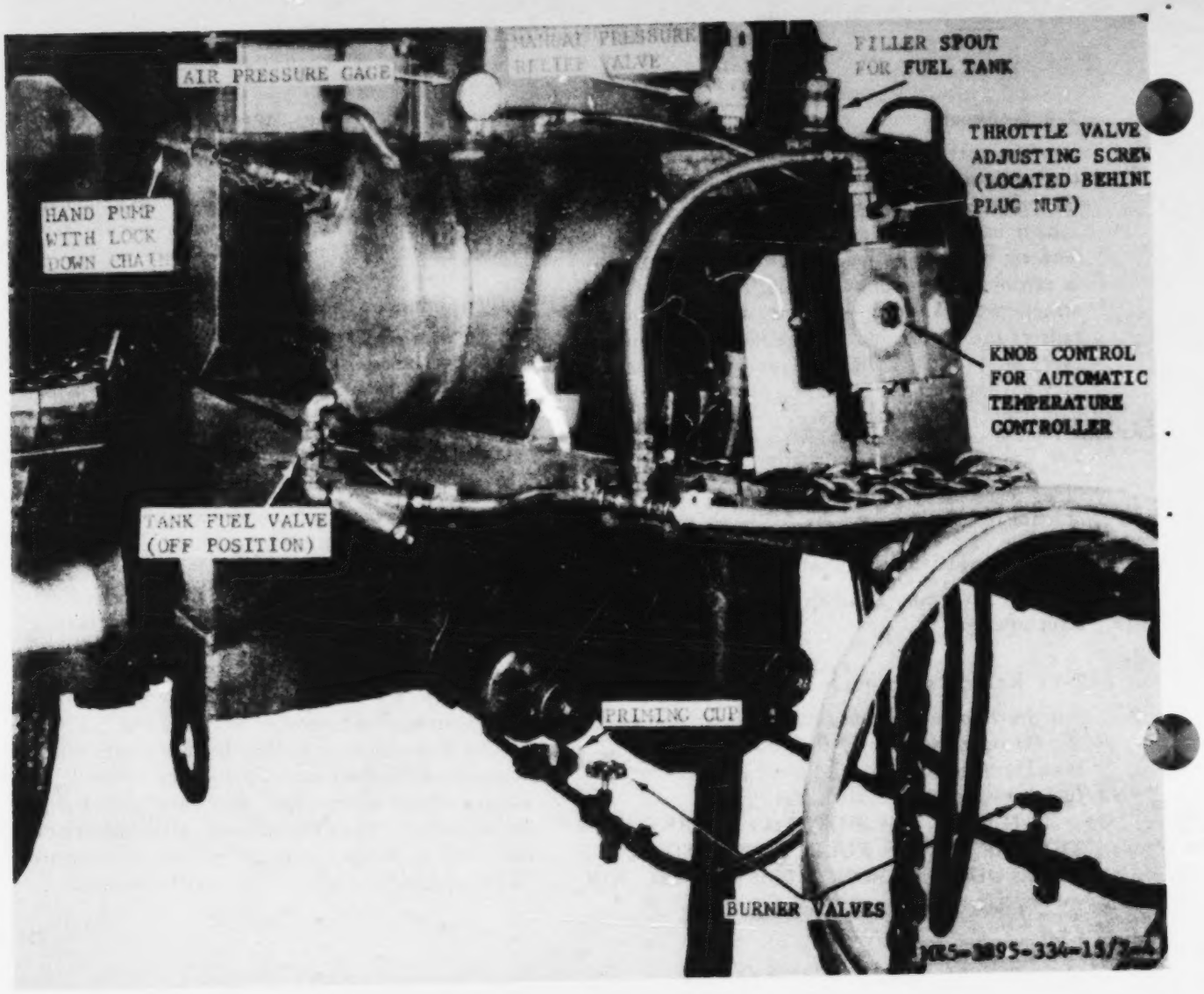

AIR PRESSURE GAGE
FILLER SPOUT FOR FUEL TANK
THROTTLE VALVE ADJUSTING SCREW (LOCATED BEHIND PLUG NUT)
HAND PUMP WITH LOCK DOWN CHAIN
KNOB CONTROL FOR AUTOMATIC TEMPERATURE CONTROLLER
TANK FUEL VALVE (OFF POSITION)
PRIMING CUP
BURNER VALVES

Figure 2-4. Burner system startup.

b. Operating Pumping System.

(1) Place levers on upper and lower three-way valves to circulate position (fig. 2-6, sheet 1).

(2) Prepare engine for startup.

(a) Open engine and pump cover (fig. 2-5).

(b) Check and fill gas tank (fig. 2-2, sheet 1).

(c) Position ON-OF switch to ON position (fig 2-2, sheet 1).

(d) Wrap starter rope on sheave (fig. 2-2. sheet 1).

(e) Close choke lever (fig. 2-2, sheet 1).

(f) Check clutch shifter to make sure clutch is disengaged (fig. 2-7).

(3) Start engine by pulling starter rope with a quick steady motion.

(4) When engine starts, open choke as engine attains operating temperature.

(5) Engage clutch with shifter (fig. 2-7) to permit pump to circulate melted material.

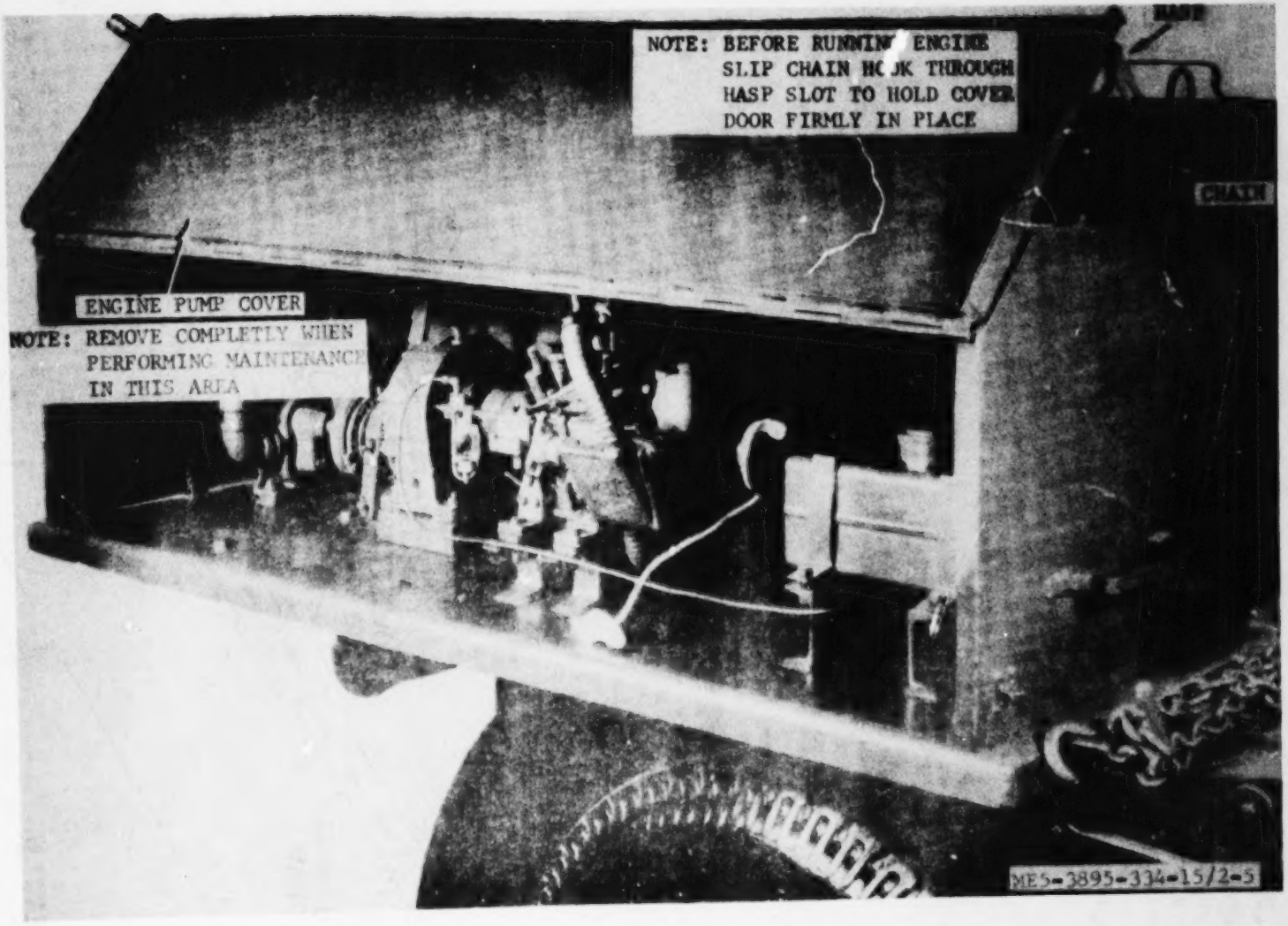


Figure 2-5. Engine pump cover.

c. Operating the Power Spray.

(1) After allowing material to circulate for approximately 10 minutes, reposition upper and lower three-way valves to spray position (fig. 2-6, sheet 2).

(2) Place spray bar nozzles over open material tank (fig. 2-8).

(3) Open control valve on spray bar and allow material to flow for about two minutes to warm spray bar.

(4) Now, close valve and remove spray bar from tank. You are now ready to commence spraying.

Note. If spraying is interrupted for more than two minutes, repeat procedures in (2) and (3), above.

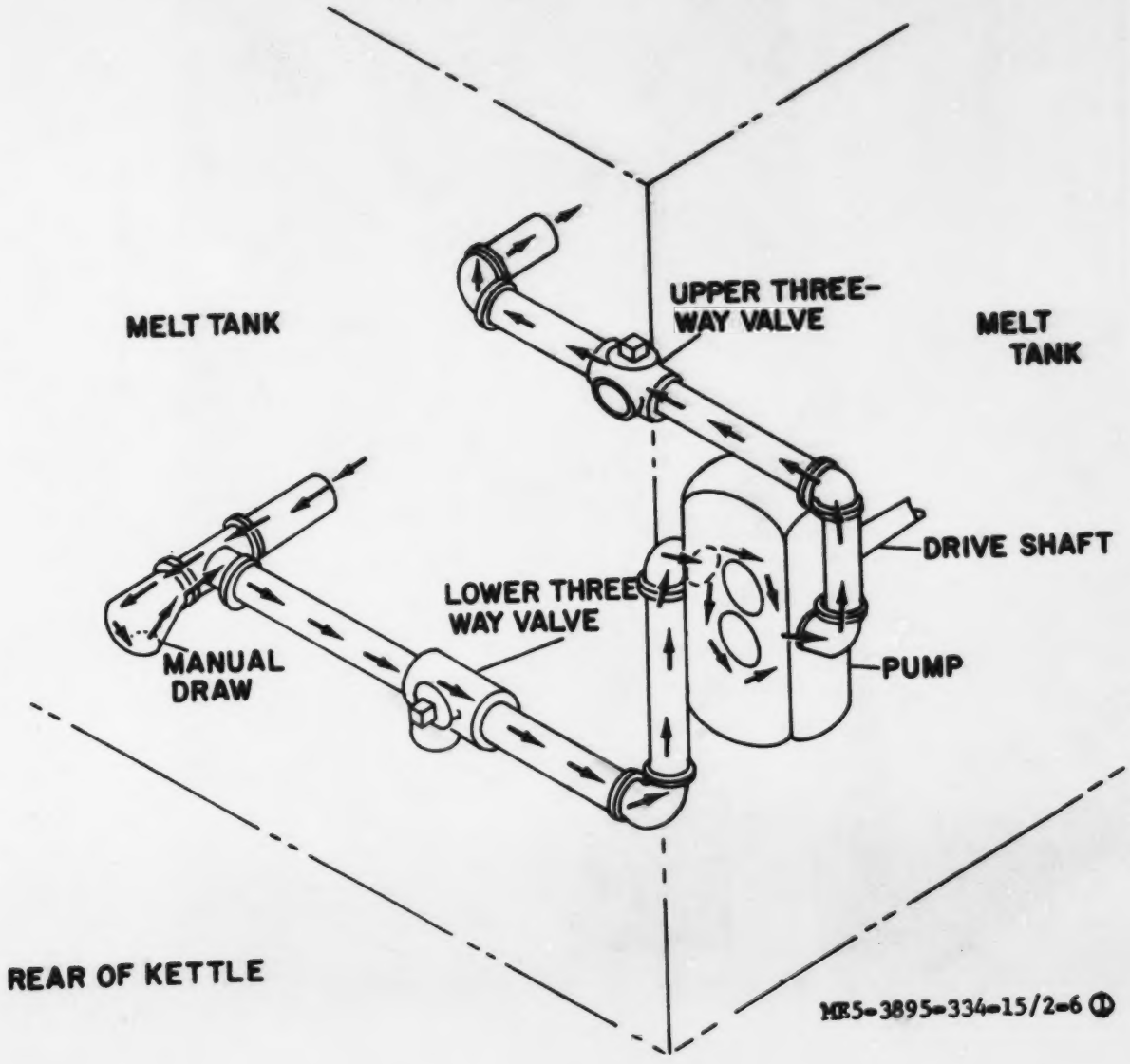


Figure 2-6. Bitumen flow chart (sheet 1 of 4).

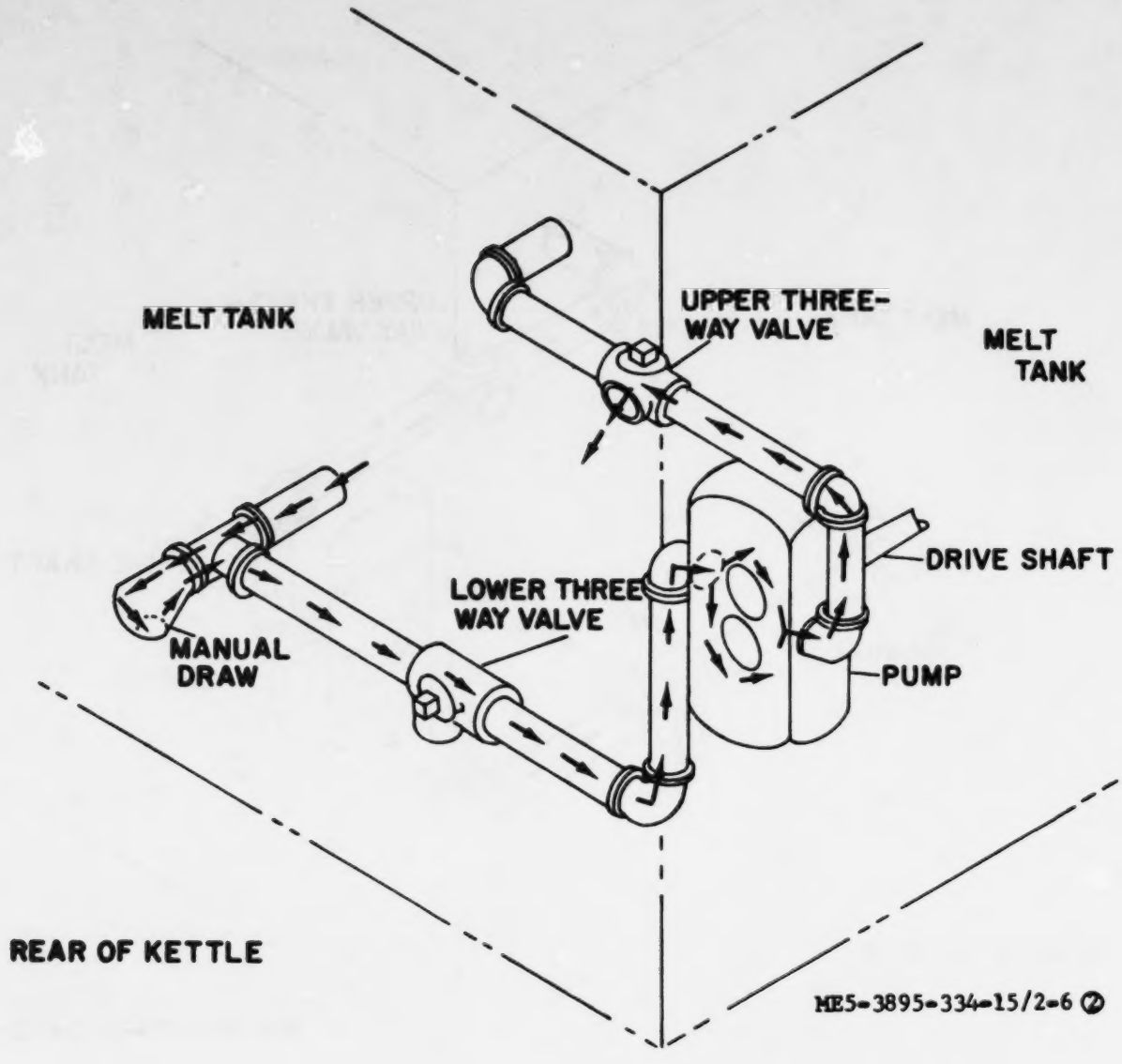


Figure 2-6. Bitumen flow chart (sheet 2 of 4).

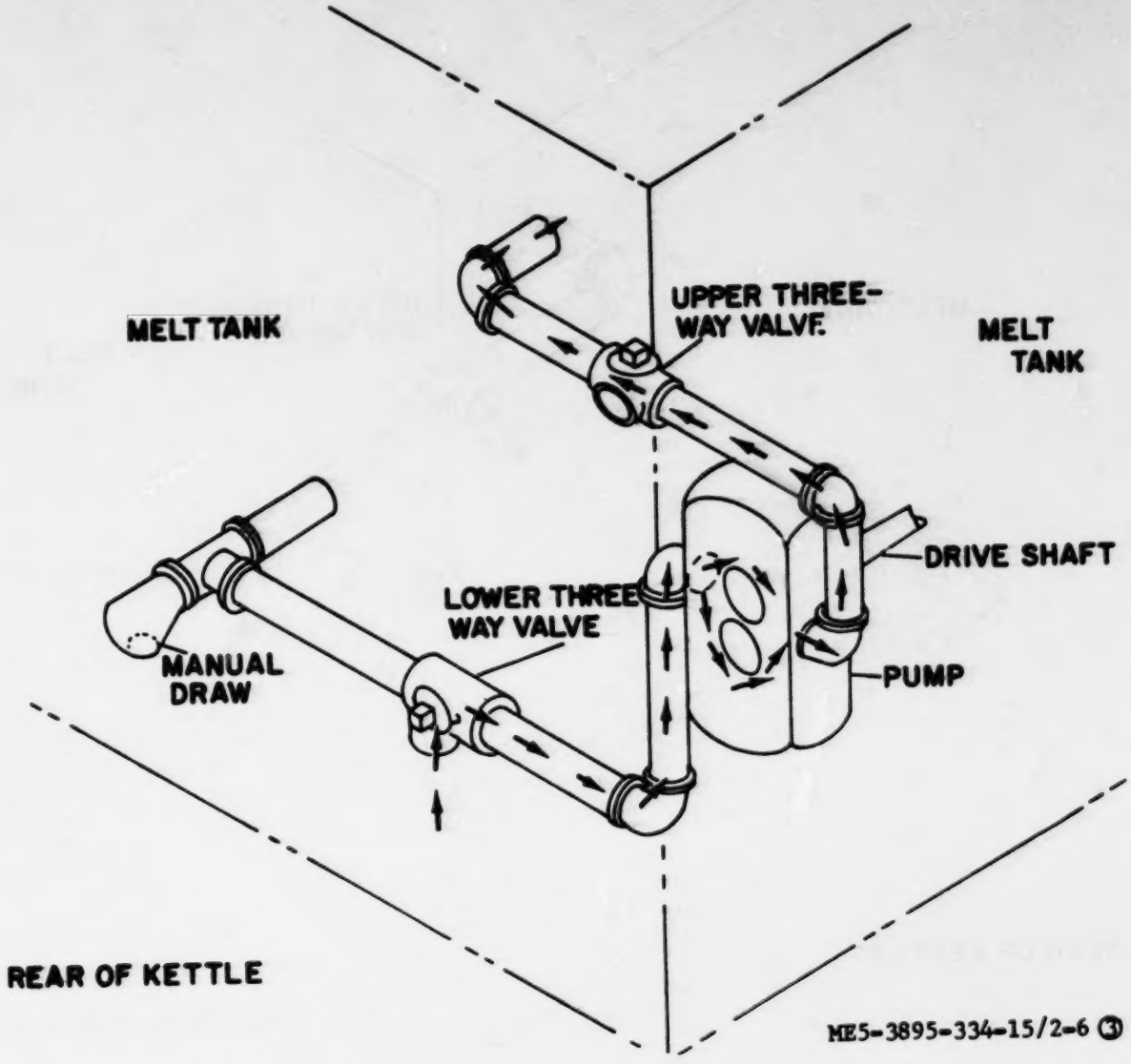


Figure 2-6. Bitumen flow chart (sheet 3 of 4).

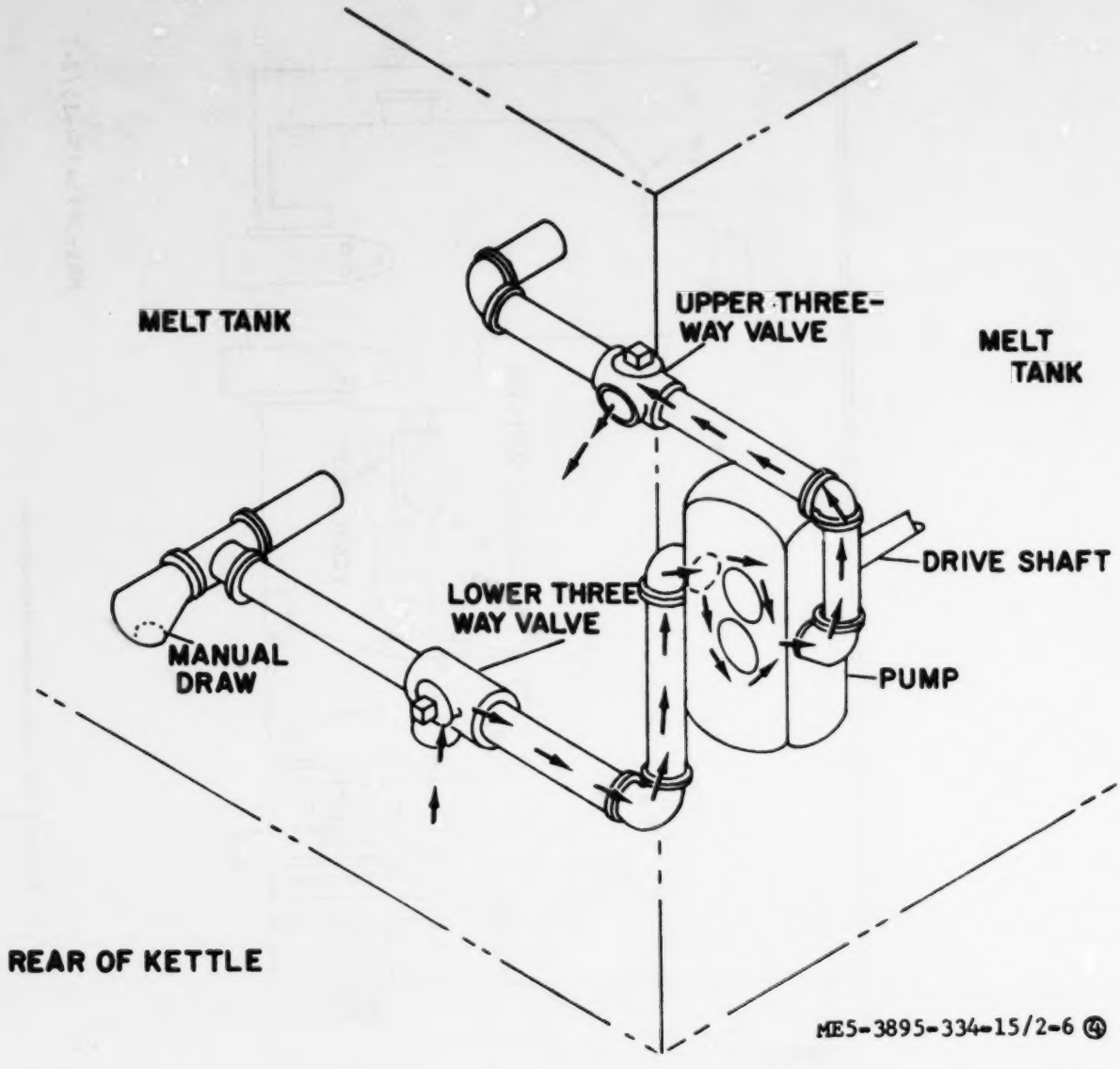
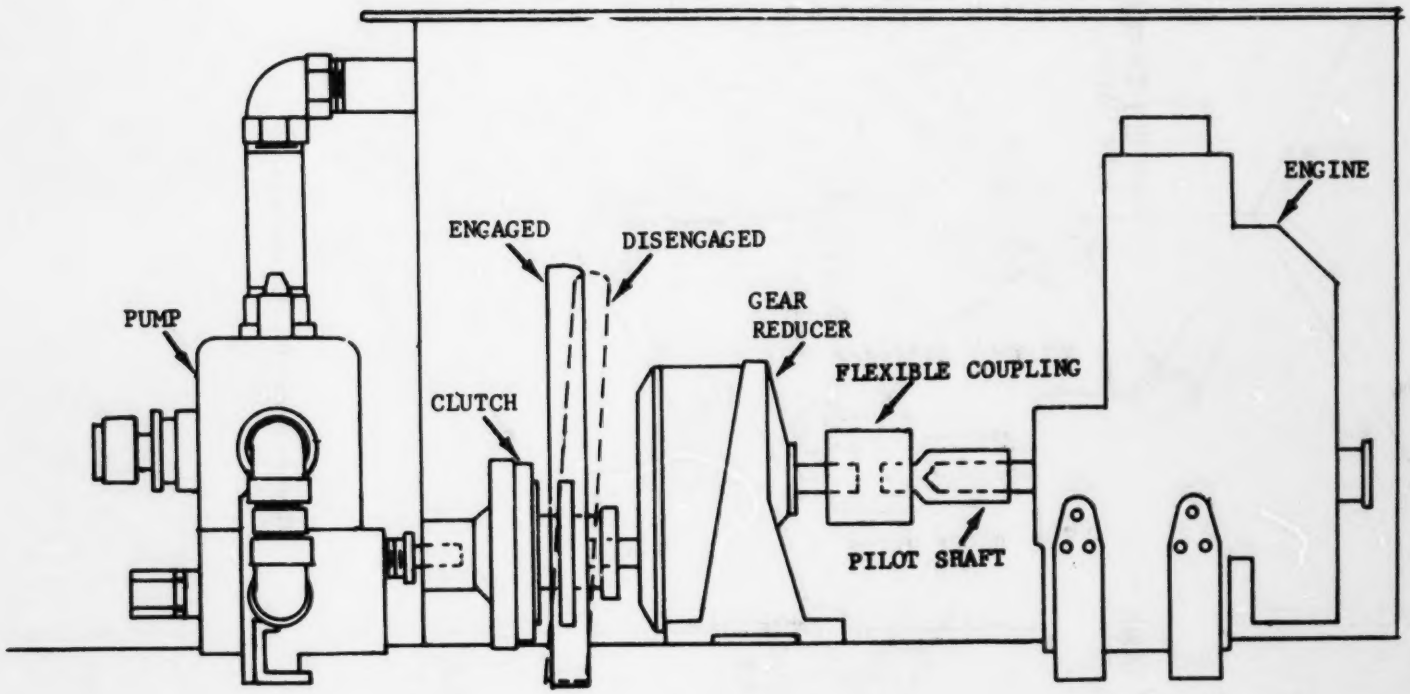


Figure 2-6. Bitumen flow chart (sheet 4 of 4).



ME5-3895-334-15/2-7

Figure 2-7. Motor spray component identification.

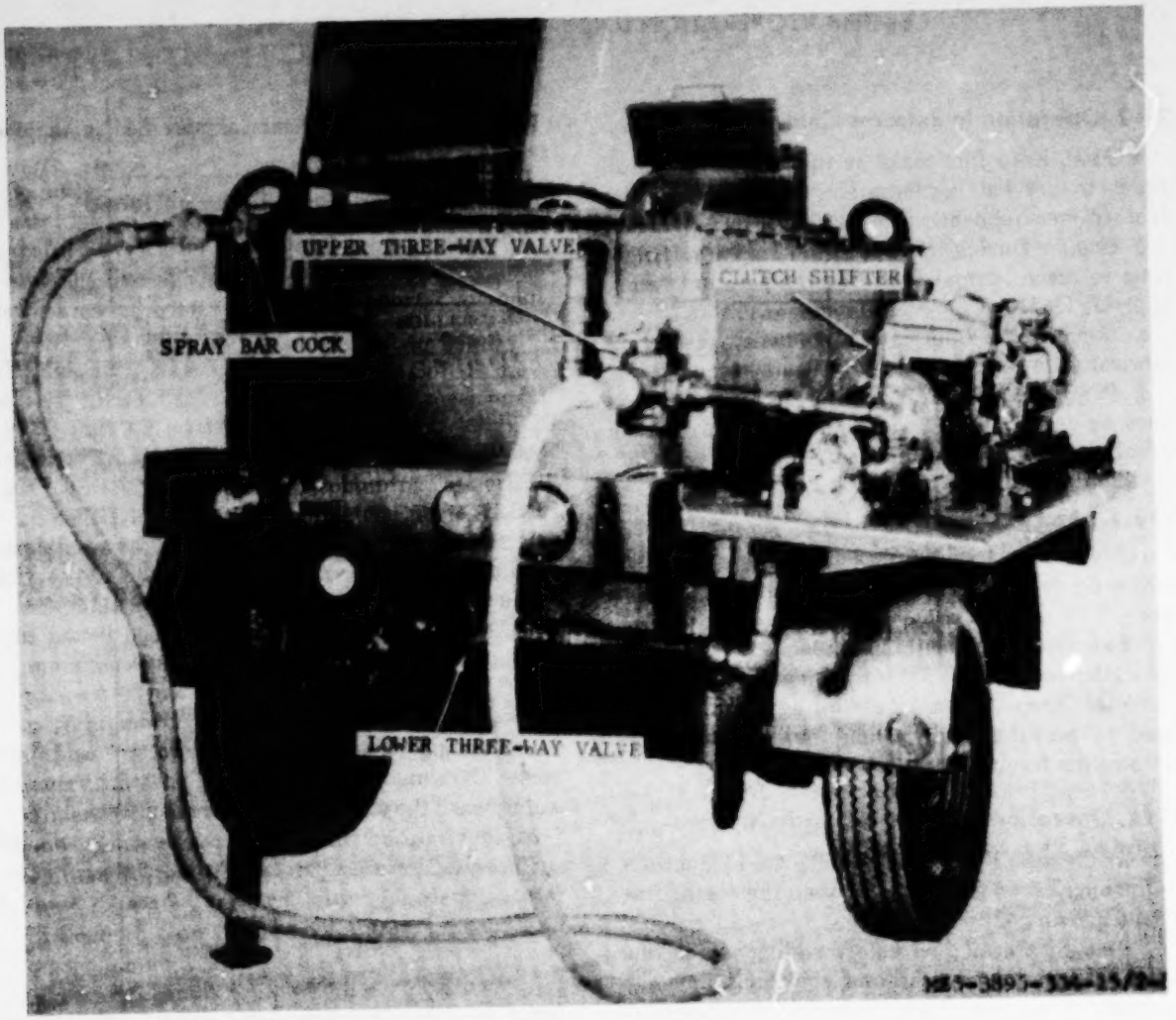


Figure 2-8. Spray controls.

d. Heating Kettle Shutdown.

(1) Turn upper three-way valve to circulating position (fig. 2-6, sheet 1).

(2) Turn lower three-way valve to draw from open side rather than from kettle. Air will be pumping in, forcing material in the lines back into the kettle (fig. 2-6, sheet 3).

(3) Turn upper three-way valve back to spraying position, forcing material in hose and spray bar out. (This may be returned to the kettle by holding spray bar over the open kettle door.)

(4) Stop pump by disengaging clutch.

(5) Attach hose from container of kerosene or solvent to open side of lower three-way valve (fig. 2-6, sheets 3 and 4).

(6) Engage clutch; pump solvent through hose and spray bar until clean (fig. 2-6, sheet 4).

(7) Disengage clutch and remove hose from lower three-way valve.

(8) Shut off engine by moving ignition switch to OFF position.

(9) Shut off manual fuel valve at tank.

(10) De-pressurize fuel tank by depressing handle of manual pressure relief valve (fig. 2-4). Close engine pump cover door, stack cover, and fasten.

Section V. OPERATION UNDER UNUSUAL CONDITIONS

2-12. Operation in Extreme Cold

a. Fuel. Keep fuel tanks as full as possible at all times to prevent condensation. Drain and service fuel strainer frequently (TM 5-2805-256-14).

b. Engine. During warmup, allow engine sufficient time to reach normal operating temperature before applying load.

c. Lubrication. Lubricate as specified in current lubrication order.

d. Pumping System. It may be necessary to heat lines, valves and pump, with hand torch, to establish circulation through the piping system.

2-13. Operation in Extreme Heat

a. Cooling. Check cooling fins on the engine cylinder frequently to make sure they are clean and undamaged.

b. Lubrication. Lubricate as specified in current lubrication order.

c. Fuel. Keep fuel tanks as full as possible at all times to prevent condensation. Drain and service fuel strainer frequently (TM 5-2805-256-14).

2-14. Operation in Dusty or Sandy Areas

a. Air Cleaner. Refer to TM 5-2805-256-14 and service the air cleaner frequently to keep the engine free of sand and dirt.

b. Fuel. Strain all fuel before adding to the fuel tanks. Clean the area around the fuel tank cap assembly to prevent the entrance of dust and dirt during the filling operation.

c. Lubrication. Lubricate as specified in the current lubrication order.

2-15. Operation Under Rainy or Humid Conditions

a. General. If the unit is outside and not operating, place a canvas or other waterproof cover over the unit during storms.

Warning: **DO NOT OPERATE THE HEATING KETTLE WITH THE MELTING TANK COVER OPEN DURING RAIN. WATER CONTACT WITH BITUMEN NEAR OR AT OPERATING TEMPERATURE WILL CAUSE EXPLOSIONS INJURIOUS TO PERSONNEL.**

b. Fuel. Keep the fuel tanks as full as possible at all times to prevent condensation. Drain and service the fuel strainer frequently (TM 5-2805-256-14).

c. Lubrication. Lubricate as specified in the current lubrication order.

2-16. Operation In Salt Water Areas

a. General. Salt water causes corrosive action on metal. Care must be taken to avoid contact with salt water; wash the unit with clean, fresh water.

b. Preservation. Paint all exposed nonpolished surfaces. Coat exposed parts of polished steel or other ferrous material with rustproofing material or a light coat of grease.

2-17. Operation at High Altitudes

Refer to TM 5-2805-256-14 for engine operation at high altitude.

CHAPTER 3
OPERATOR AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. OPERATOR AND ORGANIZATIONAL MAINTENANCE TOOLS AND EQUIPMENT

3-1. Special Tools and Equipment

The special tool required to perform operator maintenance on the burner is listed in table 3-1. Reference to an illustration and the use of this tool are listed in the table. The five-digit code preceding the stock number is the Federal supply code number for the manufacturer of the tool. No special equipment is required by organizational maintenance for performing maintenance on the kettle.

Table 3-1. Special Tools

Item	FSN or part No.	Reference		Use
		Fig.	Para	
Cleaning needle.	(03742) TK-002	3-21	3-35	To clean burner orifice plug.

3-2. Organizational Maintenance Repair Parts

Organizational maintenance repair parts are listed and illustrated in TM 5-3895-334-25P.

Section II. LUBRICATION

3-3. General Lubrication Information

a. Refer to LO 5-2805-256-12 for lubrication of engine.

b. Refer to LO 5-3895-334-12 for lubrication of bitumen kettle.

3-4. Detailed Lubrication Information

a. Care of Lubricants. Keep all lubricants (grease and oil) in closed containers and store in a clean, dry place, away from heat. Allow no dirt, dust, water, or foreign material to mix with the lubricant at any time. Keep all lubrication equipment clean and ready for use.

b. Cleaning. Keep all external parts not requiring lubrication clean from lubrication. After every lubrication operation, remove any excess lubricant from the point of application and wipe away any spilled lubricant. Old or hardened lubricants may be removed by using a cleaning solvent.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3-5. General

a. To insure that the heating kettle is ready for operation at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance checks and services to be performed are listed as described in paragraph 3-6.

b. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit will be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded, together with the corrective action taken, on DA Form 2404 (Equipment Inspection and Maintenance Worksheet), at the earliest possible opportunity.

3-6. Preventive Maintenance Checks and Services

Table 3-2 lists operator and organizational preventive maintenance checks and services.

Table 3-2. Preventive Maintenance Checks and Services

B–Before operation A–After operation M–Monthly
D–During operation W–Weekly Q–Quarterly

Item Number	Interval: Operator: Daily: B	D	A	W	Org.: M	Q	Item to be inspected	Procedure	Reference
1	X						General visual inspection	Make a general visual inspection of the unit for cracks, breaks, loose or missing bolts, nuts, etc. See that engine is securely mounted and unit set as level as possible. Inspect for tampering, damage, fuel, or bitumen leaks. Do not operate until deficiencies are corrected.	
2	X				X	X	Lubrication	Lubricate in accordance with current lubrication order.	
3	X				X	X	Engine	For preventive maintenance instructions on engine, refer to TM 5-2805-256-14.	TM 5-2805-256-14
4	X				X	X	Fuel tank and cap	Inspect fuel tank for insecure mounting and leaks. Inspect cap for defective gasket or insecure fit. Secure loose mountings. Replace leaking or damaged tank or cap.	Fig. 3-1
5	X		X		X	X	Fuel lines	Inspect for damaged or leaking fuel line or fittings. Tighten loose fittings. Replace damaged lines.	Fig. 3-1
6						X	Coupling	Inspect coupling for looseness or damaged setscrews, etc. Replace damaged parts.	Para 3-24
7				X			Gear reducer	Check vent plug for restrictions. Remove restrictions. Check reducer for insecure mounting, leaks, or damage.	Fig. 3-6
						X		Secure mountings.	
8						X	Clutch	Inspect for improper adjustment, loose or damaged parts. Adjust clutch, secure loose parts.	Fig. 3-8
9					X	X	Pump	Inspect pump for leaks or damage. Replace damaged gasket, or other parts. Repack.	Fig. 3-16

Table 3-2. Preventive Maintenance Checks and Services — Continued.

B - Before operation A - After operation M - Monthly
D - During operation W - Weekly Q - Quarterly

Item No.	Interval: Operator: Daily: B	D	A	W	Org: M	Q	Item to be inspected	Procedure	Reference
10						X	Valves	Inspect upper and lower 3-way valves for cracks, leaks, improper operation, and inadequate lubrication. Replace defective valves. Lubricate as described in the current lubrication order.	Para 3-22
11	X					X	Coupling, spray bar assembly, piping and cock.	Inspect the pipe coupling for cracks or damage. Inspect the spray bar assembly for cracks, kinks, leaks, or other damage. Inspect spray bar cock for freedom of operation and leaks. Inspect spray nozzles for restrictions. Replace or repair damaged parts. Clean nozzles.	Para 3-33, fig. 3-18
12				X		X	Burner fuel tank	Inspect fuel tank for loose mounting. Inspect cap for tight seal or damage. Inspect air pump for proper operation and damaged parts. Inspect pressure relief valve for damage & proper setting. Inspect pressure gage for proper operation and damage. Replace damaged fuel tank; secure loose mountings. Replace damaged air pump parts. Lubricate air pump. Replace defective pressure relief valve or pressure gage.	Para 3-35, fig. 3-20
13	X					X	Burner fuel lines	Inspect fuel lines and fittings for damage or leaks. Clean filter and replace any damaged parts. Replace damaged fittings, hose or pipe. Tighten leaking connections.	Para 3-35, fig. 3-20
14				X		X	Burner assemblies.	Remove and inspect burner strainer valve for dirt and damage. Inspect burner for cracks, breaks, or damage. Clean or replace strainer valve. Clean burner coils and jets. Replace damaged parts.	Para 3-35, fig. 3-21
15						X	Thermostatic control	Inspect instrument for damage. Pressurize tank, turn temperature control knob counterclockwise to determine if valve opens to bleed off air pressure at approximately 15°F above ambient temperature.	Para 3-35, fig. 3-21
16	X		X		X	X	Air lines	Inspect air line for leaks, or damaged parts. Inspect thermal element and capillary for damage. Replace damaged or malfunctioning instrument or capillary. Tighten leaking air line connections, replace damaged hose or fittings. Return temperature control knob to operating position.	Fig. 3-20
17						X	Frame assembly and melting tank	Inspect the frame for cracks breaks, dents, and loose or missing hardware. Inspect for broken welds or mis-alinement. Inspect the melting tank for cracks, breaks, and excessive carbon deposits. Inspect tank cover for warpage. Inspect fusible link for damage	Fig. 5-18

Table 3-2. Preventive Maintenance Checks and Services — Continued.

B—Before operation D—During operation A—After operation W—Weekly M—Monthly Q—Quarterly

Item Number	Interval: Operator: Daily: B	D	A	W	Org: M	Q	Item to be inspected	Procedure	Reference
								or looseness. Tighten or replace all loose or missing hardware. Straighten all minor dents. Report cracks, broken welds or misalinement to field maintenance. Report a defective tank to field maintenance. Repair or replace a damaged cover as necessary. Tighten or replace fusible link.	
18						X	Leg stands	Inspect front and rear leg stands for cracks, bends, and missing pins or chains. Repair or replace damaged leg stands. Replace missing or damaged pins and chains.	Fig. 3-13
19						X	Springs and shackle bolts	Inspect the springs for misalinement, and shifted, bent, or broken leaves. Inspect for loose or missing hardware. Inspect all shackle bolts for damage. Tighten or replace all loose or missing hardware. Replace all defective springs or shackle bolts.	Para 3-25, fig. 3-11
20						X	Axle	Inspect the axle for loose or missing mounting hardware. Inspect the axle for bent condition. Tighten or replace all loose or missing hardware. Replace a defective axle.	Para 3-25, fig. 3-11
21				X		X	Wheels	Inspect the wheels for improper operating condition. Inspect for loose or missing mounting bolts and nuts. Inspect for defective grease seals. Tighten or replace all loose or missing mounting hardware. Replace a defective wheel or grease seal.	Para 3-25, fig. 3-11
22				X		X	Tires	Inspect the tires for improper air pressure, excessive cuts, and wear, embedded foreign material, and missing valve caps. Remove all foreign material. Inflate tires to 45 psi. Replace missing valve caps and defective tires.	Para 3-25, fig. 3-10
23						X	Lights and wiring.	Inspect the lamps for unserviceability. Inspect the line for dirt, breaks, or other damage. Inspect reflectors for discoloration, breakage, or insecure mounting. Inspect all wiring for defective installation, corroded or broken terminals and insecure clips. Replace all defective lamps. Clean or replace dirty or broken reflectors. Repair or replace all defective wiring as necessary. Tighten or replace all loose or missing mounting hardware.	Para 3-23, fig. 3-2 thru 3-5
24						X	Tools and equipment	Inspect the condition of all tools and equipment assigned to the heating kettle. Inspect the toolbox for damage or insecure mounting. See that all tools are clean, serviceable, and properly stowed and mounted. Repair a damaged toolbox.	

Table 3-2. Preventive Maintenance Checks and Services — Continued.

Item No.	Interval: Operator: Daily: B	D	A	W	Org: M	Q	Item to be inspected	Procedure	Reference
	B - Before operation; D - During operation; A - After operation; W - Weekly; M - Monthly; Q - Quarterly								
25						X	Appearance	Inspect the kettle for cleanliness, legibility of markings, and condition of paint. Correct all deficiencies or report them to field maintenance.	

Section IV. OPERATOR MAINTENANCE

3-7. Engine

Refer to TM 5-2805-256-14.

3-8. Checks and Services

Perform the following inspections and services as needed.

3-9. Fuel System

Inspect fuel lines and fuel tank cap. If tank cap is found defective, replace when needed.

3-10. Fuel Filters

Inspect fuel filters for obstructions.

3-11. Electrical System

Inspect tail and marker lamp assembly and trailer coupling cable for non-operation or surface damage.

3-12. Power Transfer

Inspect vent plug on gear reducer. Inspect flexible coupling. Remove restrictions from vent plug.

3-13. Wheels and Track

Inspect wheel assembly, tires and tubes. Service tires and tubes as needed.

3-14. Landing Gear, Leveling Jacks

Adjust leveling jacks for proper leveling when needed.

3-15. Gages (Non-Electrical)

Inspect thermometer and air pressure gage for proper readings.

3-16. Pumps

Inspect pressure relief valve. Adjust nut packing when needed. Service cone and collar shifter. Service pump assembly as needed.

3-17. Fuel Tank (Burner)

Inspect safety valve assembly, air line, pipes and fittings; adjust the pressure regulator as needed. Service the fuel valve shutoff and fuel tank, and fill cap assembly as needed. Replace fill cap assembly as needed.

3-18. Material Spray Bar

Inspect quick-action coupling and spray valve for proper ease of operation. Service material spray bar and spray nozzle for proper flow. Replace spray nozzle as needed.

3-19. Material Piping and Accessories

Inspect fusible link, all piping and fittings. Also inspect the quick-action couplings and spray hose. Service both upper and lower three-way valves and the melting vat.

Section V. TROUBLESHOOTING

3-20. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the heating kettle and its components. Malfunctions which may occur are listed in table 3-3. Each malfunction stated is followed by a list of probable causes of the trouble. The corrective action recommended is described opposite the probable cause. Refer to TM 5-2805-256-14 for engine troubleshooting.

Table 3-3. Troubleshooting

Malfunction	Probable cause	Corrective action
1. Fuel quantity inadequate for preheating burner.	*a.* Burner shutoff valve closed.	*a.* Open burner shutoff valve.
	b. Burner shutoff valve strainer clogged.	*b.* Remove and clean strainer screen (7, fig. 3-21).
	c. Main fuel strainer clogged.	*c.* Remove and clean strainer screen (fig. 3-20) (para 3-35*f*).
	d. Burner jet plugged.	*d.* Clean jet (fig. 3-21) (para 3-17).
	e. Fuel tank not pressurized.	*e.* Pressurize fuel tank to 25 psi (fig. 2-2*a*) (para 2-11*a*).
	f. Water in fuel tank.	*f.* Drain fuel tank, replenish fuel supply.
	g. Relief valve out of adjustment or defective.	*g.* *Adjust or replace relief valve (fig. 3-20) (para 3-35*b*).
2. Burner fails to ignite or stops burning.	*a.* Burner jet plugged.	*a.* Clean jet (fig. 3-20) (para 3-17).
	b. Fuel tank pressure inadequate.	*b.* Pressurize fuel tank to 25 psi (fig. 2-2*a*) (para 2-11*a*).
	c. Burner shutoff valve strainer clogged.	*c.* Remove and clean strainer screen (fig. 3-21) (para 3-35*e*).
	d. Main fuel strainer clogged.	*d.* Remove and clean main strainer screen (fig. 3-20) (para 3-35*f*).
	e. Water in fuel tank.	*e.* Drain fuel tank, replenish fuel tank.
	f. Burner coil excessively carboned.	*f.* *Remove burner and clean coils (fig. 3-21) (para 3-35*c*).
	g. Thermostat setting below or at material temperature.	*g.* Set thermostat at desired operating temperature (fig. 2-4) (para 2-11*a*).
3. Burner flame insufficient or fluctuating	*a.* Wrong or poor grade of fuel.	*a.* Drain fuel tank and replenish fuel supply.
	b. Water in fuel tank.	*b.* Drain fuel tank and replenish fuel supply.
	c. Fuel tank pressure low.	*c.* Pressurize fuel tank to 25 psi (fig. 2-2*a*) (para 2-11*a*).
	d. Burner jet plugged.	*d.* Clean jet (fig. 3-21) (para 3-17).
	e. Burner coil excessively carboned.	*e.* *Remove burner and clean coil (fig. 3-21) (para 3-35*c*).
	f. Fuel surge in line.	*f.* Preheat the burner (fig. 2-4) (para 2-11*a*).
	g. Burner shutoff valve strainer clogged.	*g.* Remove and clean strainer screen (fig. 3-21) (para 3-35*e*).
	h. Main fuel strainer clogged.	*h.* Remove and clean main strainer screen (fig. 3-21) (para 3-35*f*).
4. Burner flame fails to reduce when proper operating temperature is reached.	*a.* Thermometer and thermostat are at opposite ends of melting tank. Heat may not be uniform throughout.	*a.* Circulate bitumen (fig. 2-6) (para 2-11*b*).
	b. Thermostat heat sensor defective or damaged.	*b.* *Replace thermal sensing element (fig. 3-21) (para 3-35*g*).
5. Burner flame fails after operating temperature is reached.	*a.* Burner shutoff valve partially closed.	*a.* Open burner shutoff valve.
	b. Fuel tank pressure low.	*b.* Pressurize fuel tank to 25 psi (fig. 2-2) (para 2-11*a*).
	c. Throttling valve not open sufficiently.	*c.* *Turn throttle valve adjusting screw clockwise, slowly, until desired results occur (fig. 2-4).
6. Fuel tank pressure drops excessively.	*a.* Burner shutoff valve open on manual burner when not in use.	*a.* Close manual burner shutoff valve firmly.
	b. Air line from fuel tank to thermostat leaking.	*b.* *Tighten fittings or replace damaged hose (fig. 3-20) (para 3-35).
	c. Hand pump check valve defective.	*c.* Replace check valve (fig. 3-21) (para 3-35*a*).
	d. Pressure relief valve defective.	*d.* *Replace pressure relief valve (fig. 3-20) (para 3-35*b*).
	e. Overtemperature shutoff valve is open.	*e.* Material temperature has risen 15° above thermostat setting. Reset if necessary, or wait until bitumen temperature drops. If bypass valve remains open, replace defective thermostat.

Table 3-3. Troubleshooting — Continued

Malfunction	Probable cause	Corrective action
7. Heating kettle smoke excessively black.	a. Improper preheating procedure.	a. Refer to paragraph 2-11a.
	b. Burner flame fluctuates.	b. Refer to item 3, above.
	c. Melted bitumen leaking into combustion chamber.	c. Inspect melting compartment for leaks; report leaks noted to DS maintenance.
8. Thermometer indicates wrong temperature.	a. Protective well covered by layer of carbon.	a. Clean protective well.
	b. Defective thermometer.	b. Replace the thermometer.
9. Bitumen material fails to flow from drain.	a. Bitumen material not hot enough.	a. Heat to proper temperature.
	b. Drain clogged.	b. Clear drain by heating with hand torch.
10. Pump fails to operate or operates properly.	a. Bitumen material not hot enough.	a. Heat to proper temperature.
	b. Cold bitumen material in line or valves.	b. Warm lines, valves and pump body with hand torch. Jog clutch and continue warming until pump runs freely.
	c. Bitumen level in melting tank below pump suction connection.	c. Replenish melting kettle with bitumen to proper operating level.
	d. Relief valve improperly adjusted or defective.	d. *Adjust the relief valve (fig. 3-17) or replace relief valve (fig. 3-16) (para 3-31g).
	e. Pump defective.	e. *Replace pump (fig. 3-15) (para 3-31c).
11. Clutch fails to operate or operates improperly.	a. Clutch out of adjustment.	a. *Adjust clutch (fig. 3-8) (para 3-24b).
	b. Clutch defective.	b. *Replace clutch.
12. Gear reducer fails to operate.	Gear reducer damaged or defective.	*Replace gear reducer (fig. 3-7) (para 3-24c).
13. Lights fail to operate or operate improperly.	a. Lamp burned out.	a. *Replace lamp.
	b. Loose connections.	b. *See that all ferrules are firmly seated in the proper sockets (wiring diagram, fig. 1-3).
	c. Ground lead loose or missing.	c. *Tighten or replace ground lead (fig. 1-3).
	d. Lamp assembly defective.	d. *Replace lamp assembly (fig. 3-2 & 3-3) (para 3-23a).
	e. Wiring harness damaged or defective.	e. Repair or replace wiring harness (fig. 3-4) (para 3-23c).
	f. Trailer coupling cable damaged or defective.	f. *Replace cable (fig. 3-5) (para 3-23d).
	g. Towing vehicle electrical system defective.	g. Report condition to operator of towing vehicle.
14. Trailer does not track properly.	a. Tire pressure low.	a. *Inflate tires to 45 psi.
	b. U-bolts loose or broken.	b. *Tighten or replace U-bolts (fig. 3-11) (para 5-15).
	c. Spring or center bolt broken.	c. *Replace spring or center bolt (fig. 3-11) (para 5-15).
	d. Shackle bolt loose missing, or broken.	d. *Tighten or replace shackle bolt (fig. 3-11) (para 3-7).
15. Tire wear excessive.	a. Loose hub bolts.	a. *Tighten hub bolts (fig. 3-10) (para 3-25a).
	b. Wheel bent.	b. *Replace wheel (fig. 3-10) (para 3-25a).
	c. Axle bent.	c. *Remove and straighten, or replace axle (fig. 3-11) (para 5-15).

Note. Refer all corrective action to organizational maintenance where asterisks (*) appear.

Section VI. FIELD EXPENDIENT REPAIRS

3-21. General

Operational troubles may occur while the heating kettle is operating in the field where supplies and repair parts are not available and normal remedial action cannot be performed. When this condition exists, the expedient remedies listed below may be used only upon the decision of the unit commander. Equipment so repaired must be removed from operation at the earliest possible moment and properly repaired before being placed in operation again.

Trouble	Expedient remedy
Burner fuel hose assemble	Remove defective section, insert metal tube, and secure with clamps.
Thermostat defective	Shut down automatic burner by closing valve at burner. Fire kettle with manually controlled burner.

Caution: **OBSERVE THE THERMOMETER AND STOP THE BURNER WHEN THE BITUMEN MATERIAL REACHES OPERATING TEMPERATURE.**

Section VII. ORGANIZATIONAL MAINTENANCE PROCEDURES

3-22. Engine

a. Engine Maintenance. For operator and organizational maintenance of the engine, refer to TM 5-2805-256-14.

b. Engine Removal and Installation.

(1) Refer to figure 3-1 for fuel line and filter, removal and installation.

(2) Refer to figure 3-1 for engine, removal and installation. Refer to (8, fig. 3-6) for adaptor shaft removal.

3-23. Electrical System

a. Refer to figure 3-2 for blackout light assembly, removal and installation.

b. Refer to figure 3-3 for tail, turn, stoplight assembly, removal and installation.

c. Refer to figures 3-2, 3-3, for bulb removal and installation.

d. Refer to figure 3-4 for wiring harness, removal and installation.

e. Refer to figure 3-5 for trailer coupling cable, removal and installation.

KEY to figure 3-1:

1. Hexagon head capscrew
2. Hexagon nut
3. Bevel washer
4. Lockwasher
5. Engine mtg bracket
6. Engine mtg bracket (right-hand)
6. Engine mtg bracket (left-hand)
7. Hexagon head capscrew
8. Lockwasher
9. Military standard gasoline engine
10. Hexagon head capscrew
11. Hexagon nut
12. Bevel washer
13. Lockwasher
14. Tank attaching strap
15. Tank attaching strip
16. Fuel tank assembly
17. Fuel tank cap
18. Fuel line
19. Fuel line assembly
20. Fuel line clip
21. Brass pipe nipple

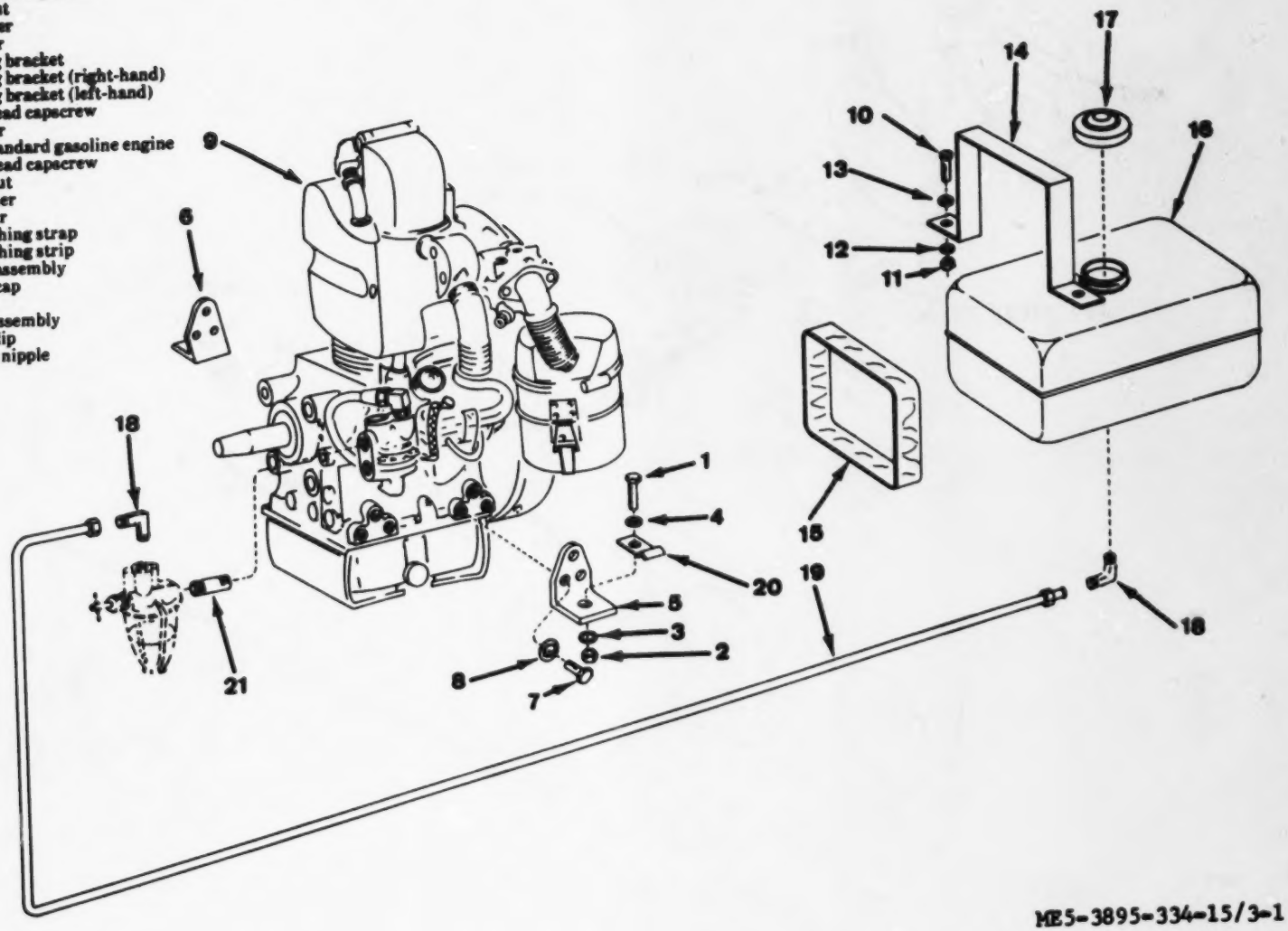


Figure 3-1. Fuel system and engine, removal and installation.

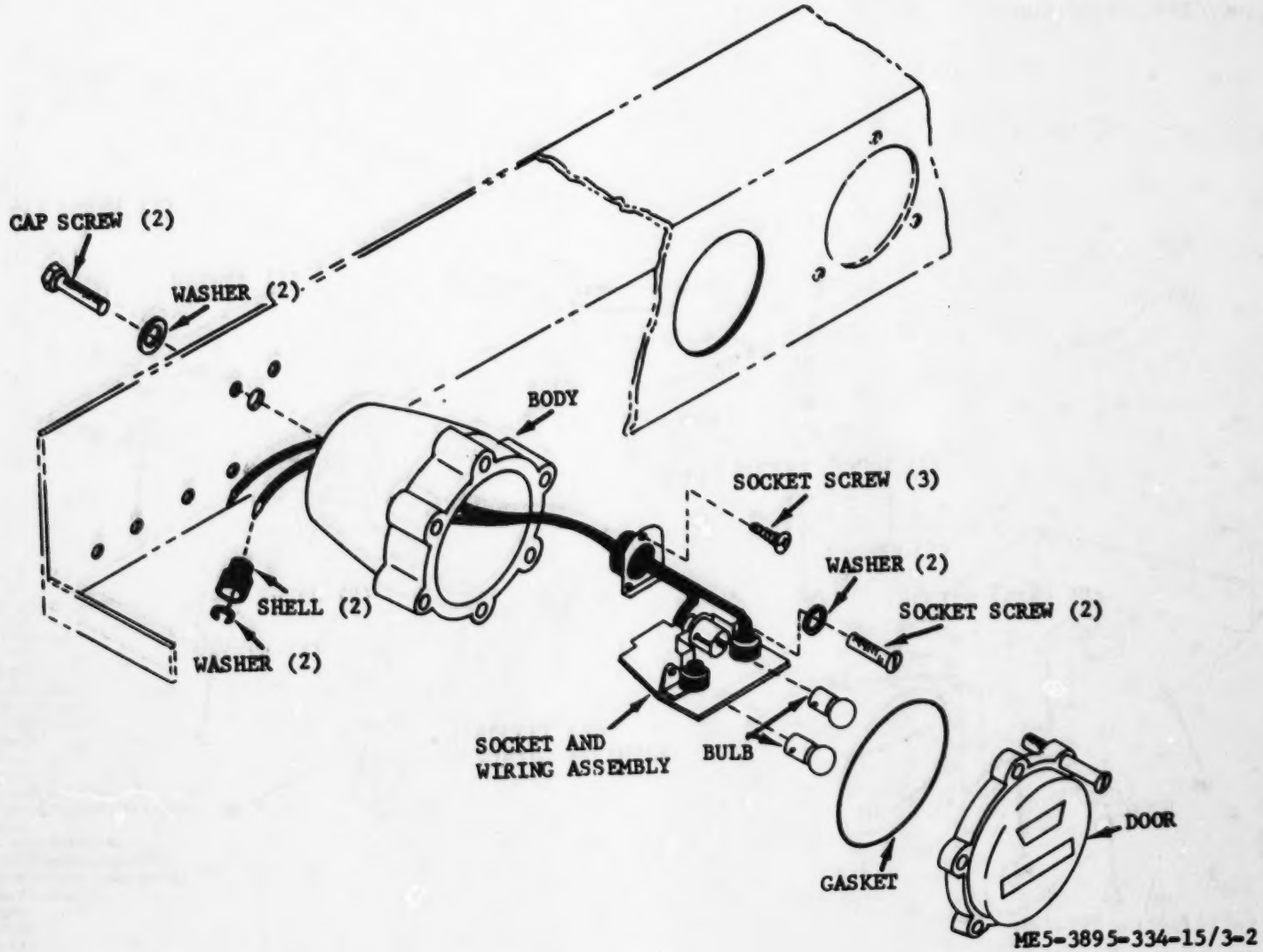


Figure 3-2. Blackout light, removal and installation.

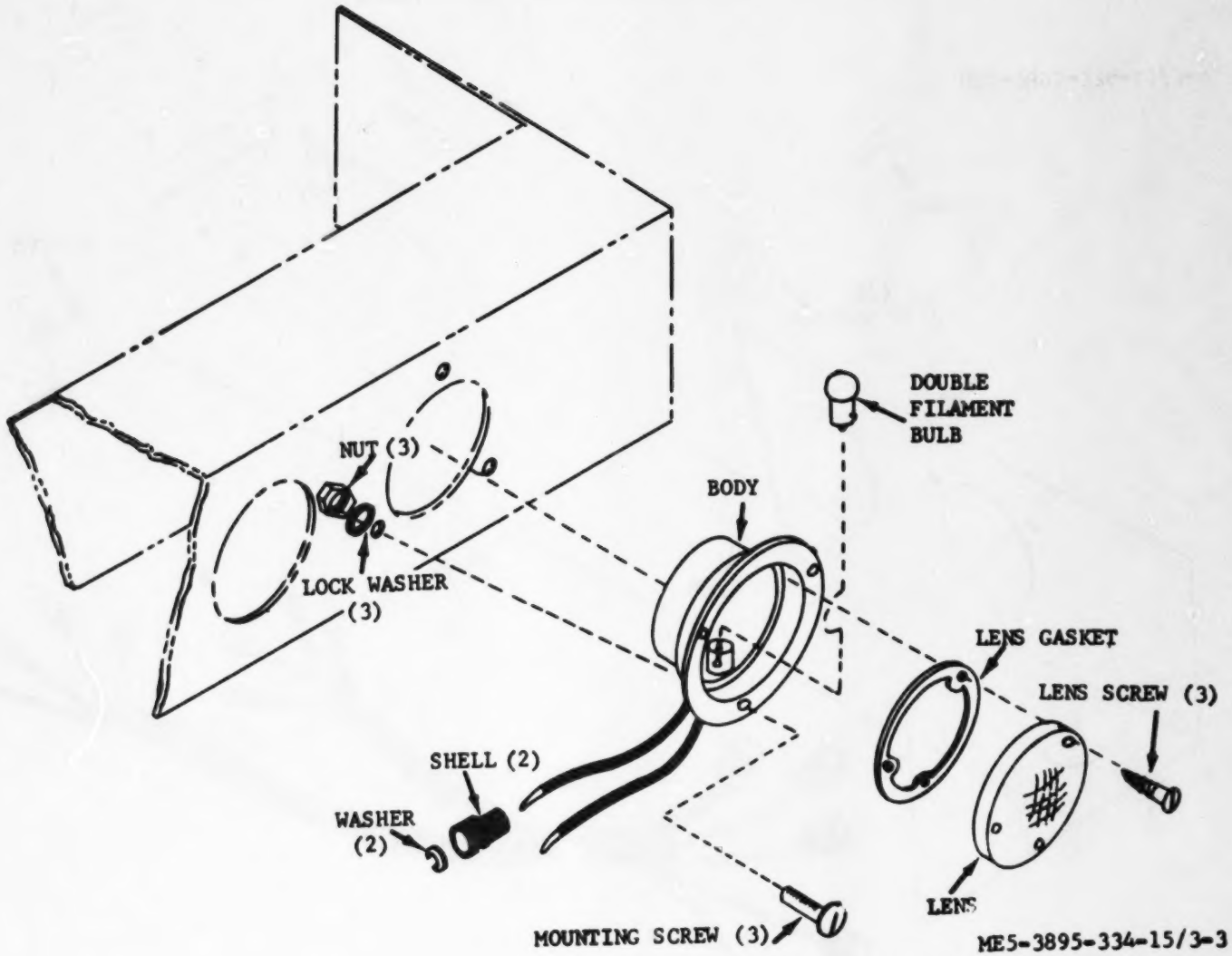


Figure 3-2. Tail, turn, and stoplight, removal, disassembly, installation and assembly.

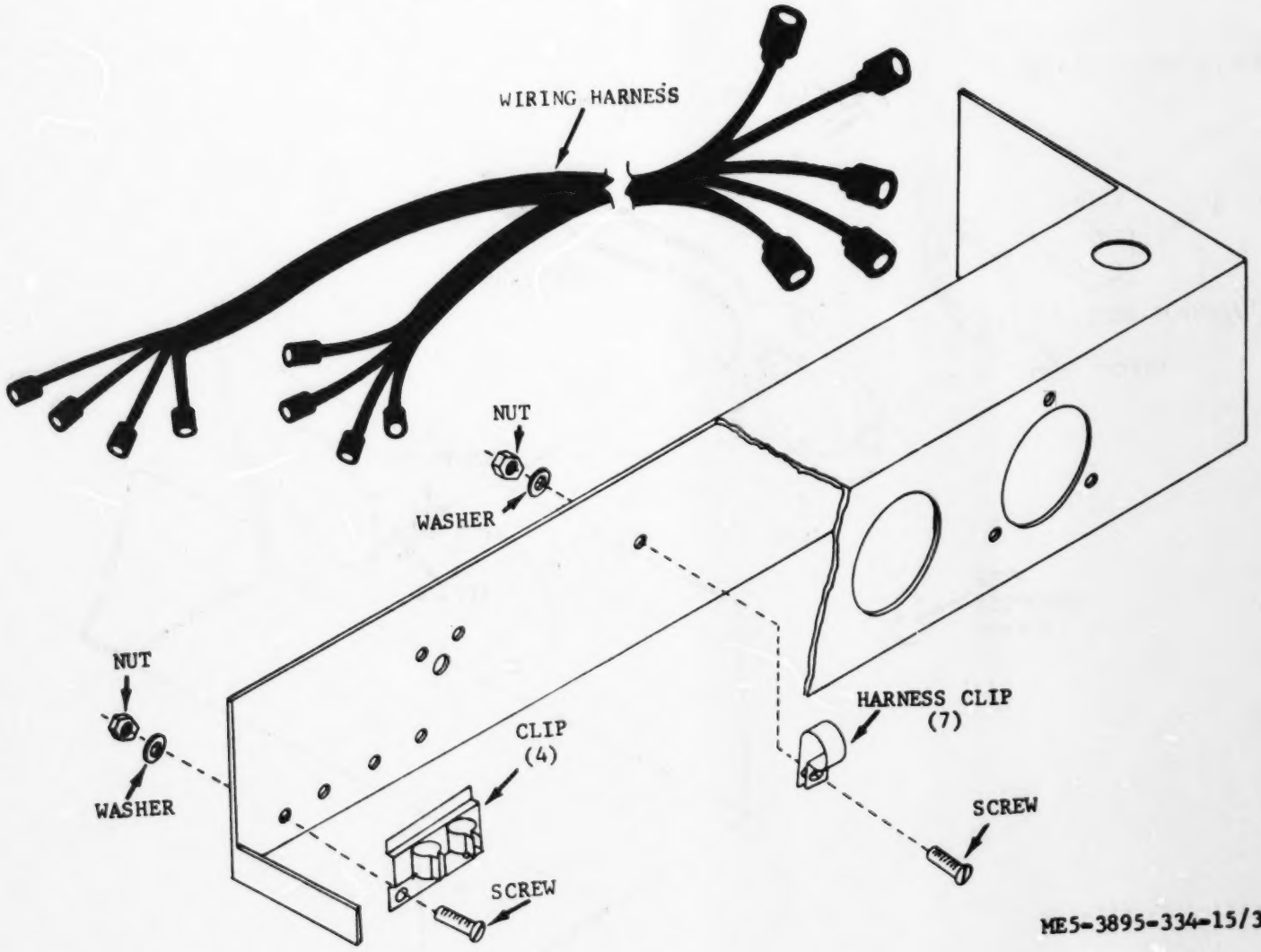


Figure 3-4. Wiring harness, removal and installation.

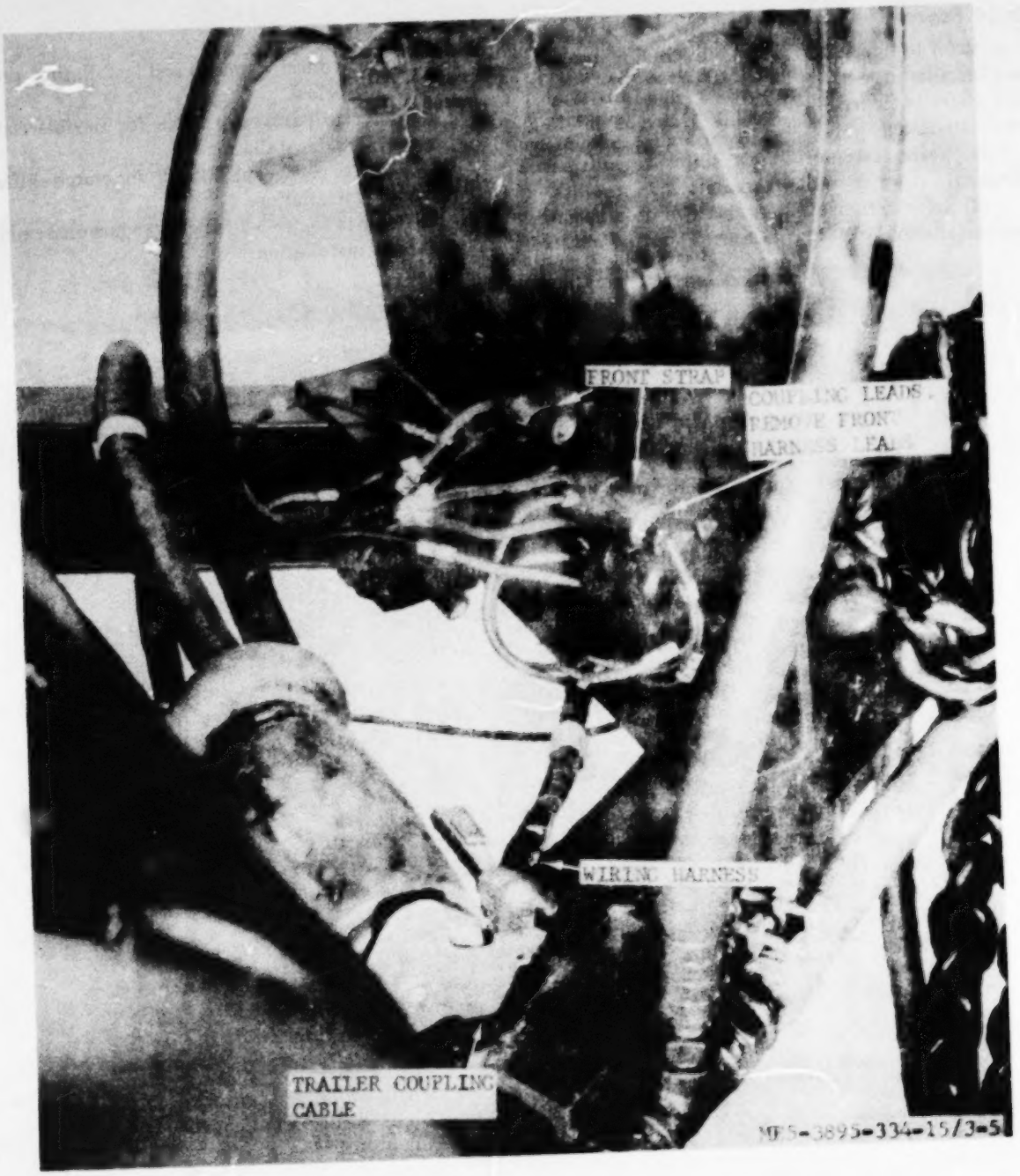


Figure 3-5. Trailer coupling cable, removal and installation.

3-24. Power Transfer

a. Refer to figure 3-6 for flexible coupling, removal and installation.

b. Refer to figure 3-7 for clutch assembly, removal and installation.

(1) Refer to figure 3-8 for clutch assembly adjustment.

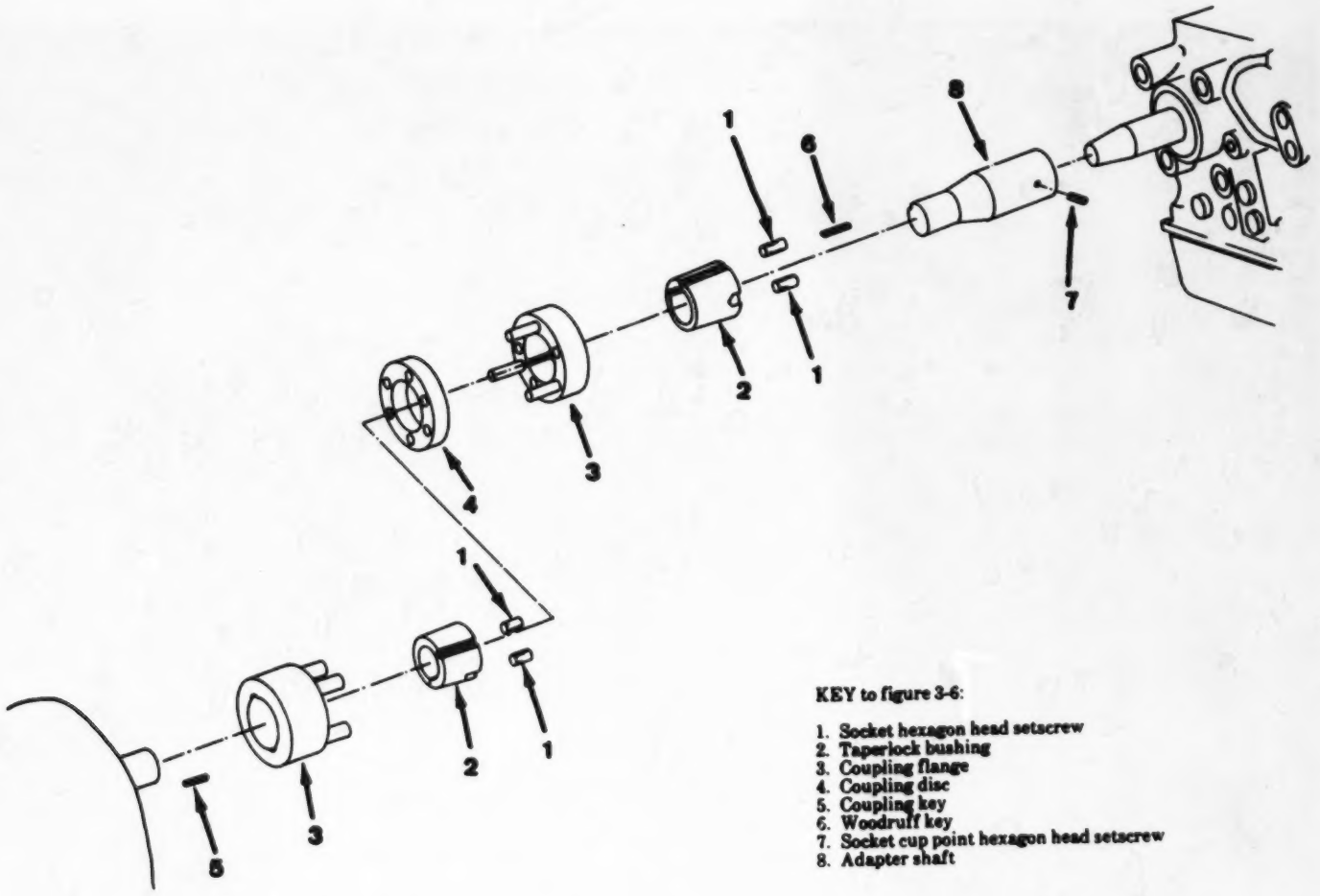
(2) Refer to figure 3-9 for clutch shifter, removal and installation.

c. For gear reducer, removal and installation, reter to (1) thru (3), below.

(1) Refer to paragraph 3-24*a* for flexible coupling, removal and installation.

(2) Refer to paragraph 3-24*b*(2) for clutch shifter, removal and installation.

(3) Refer to figure 3-7 for gear reducer assembly, removal and installation.



KEY to figure 3-6:

1. Socket hexagon head setscrew
2. Taperlock bushing
3. Coupling flange
4. Coupling disc
5. Coupling key
6. Woodruff key
7. Socket cup point hexagon head setscrew
8. Adapter shaft

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Figure 3-6. Flexible coupling, removal, disassembly, installation and assembly.

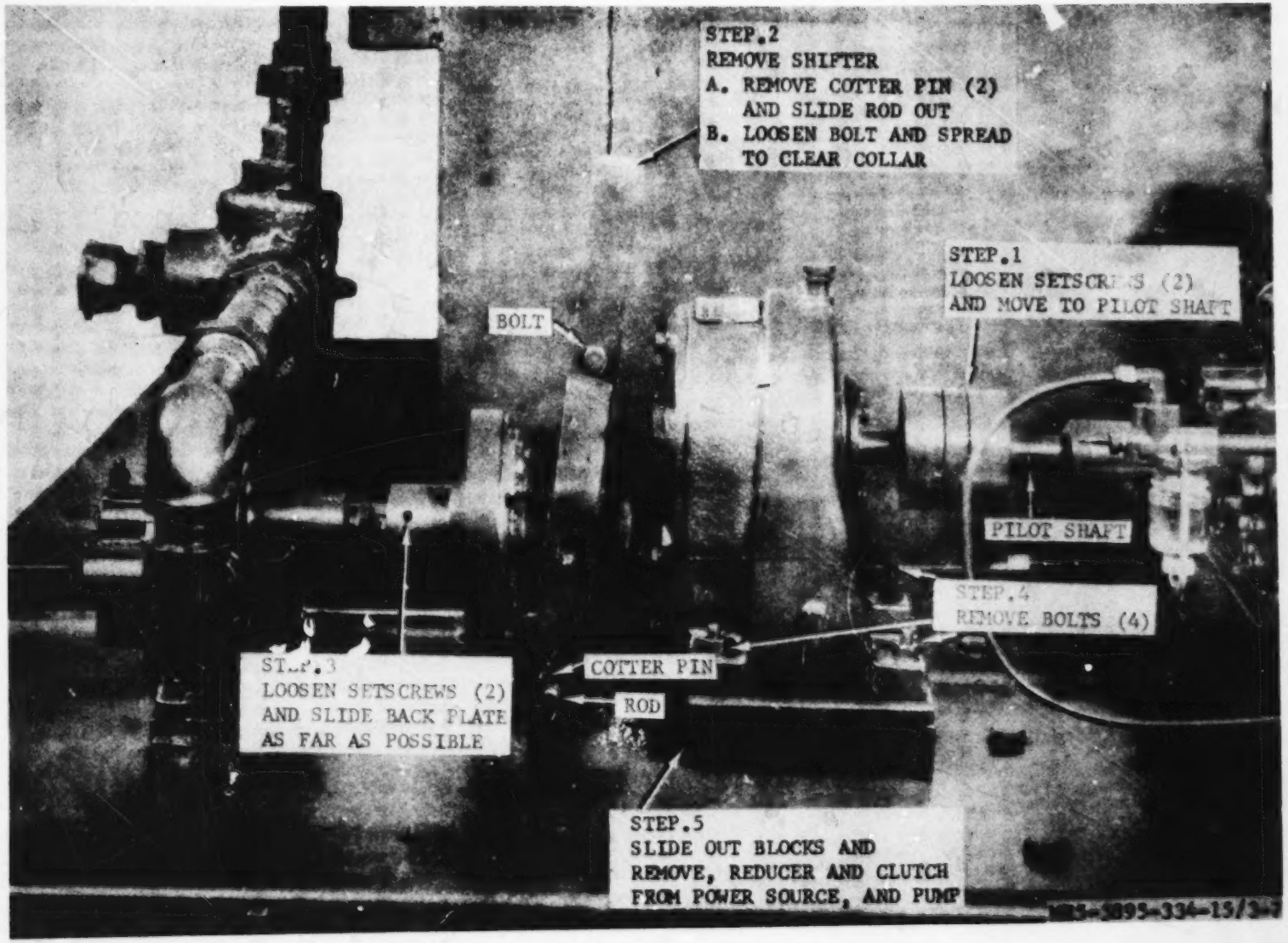

Figure 2-7. Gear reducer and clutch assembly, removal and installation.

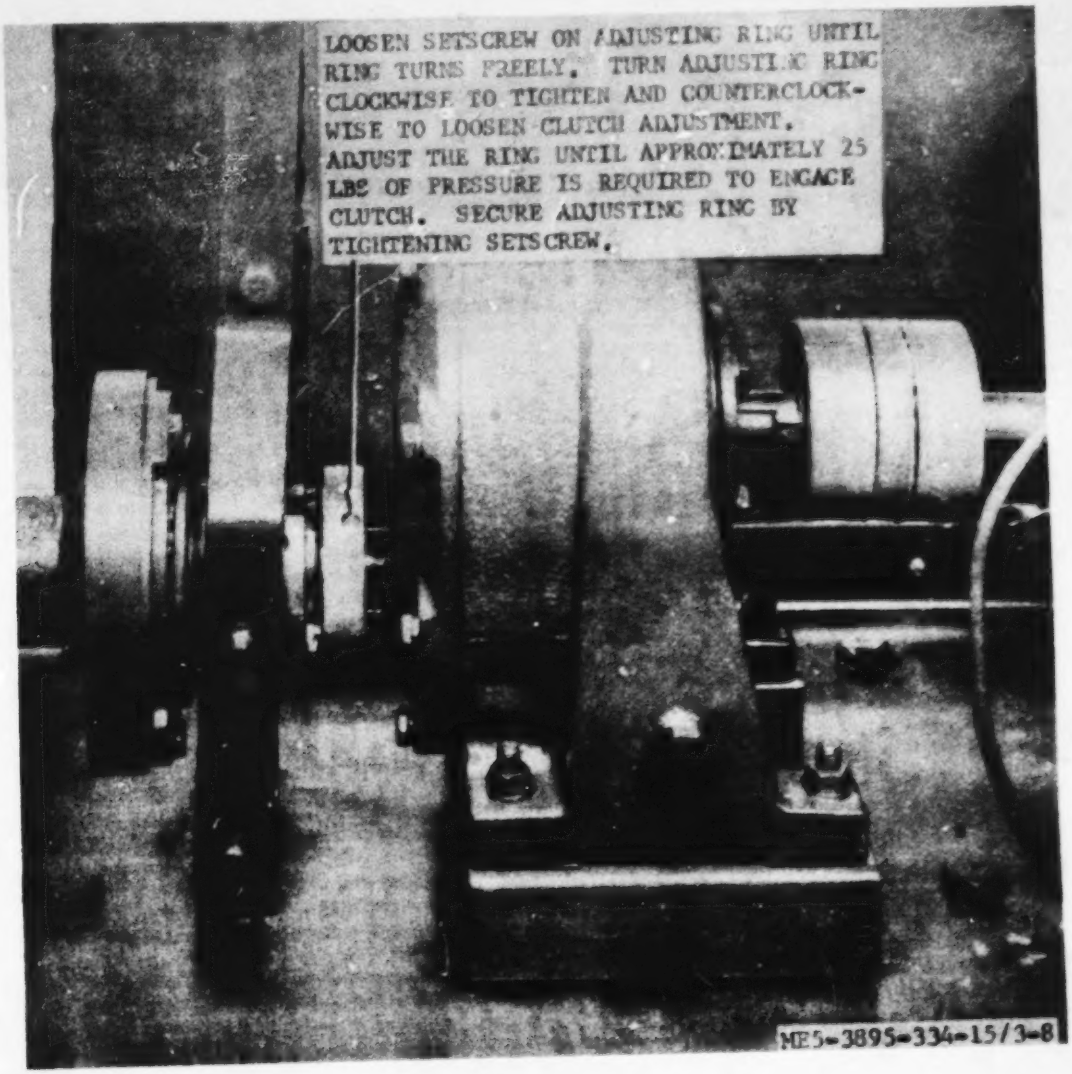
LOOSEN SETSCREW ON ADJUSTING RING UNTIL RING TURNS FREELY. TURN ADJUSTING RING CLOCKWISE TO TIGHTEN AND COUNTERCLOCKWISE TO LOOSEN CLUTCH ADJUSTMENT. ADJUST THE RING UNTIL APPROXIMATELY 25 LBS OF PRESSURE IS REQUIRED TO ENGAGE CLUTCH. SECURE ADJUSTING RING BY TIGHTENING SETSCREW.
ME5-3895-334-15/3-8

Figure 3-8. Clutch assembly, adjusting procedures.

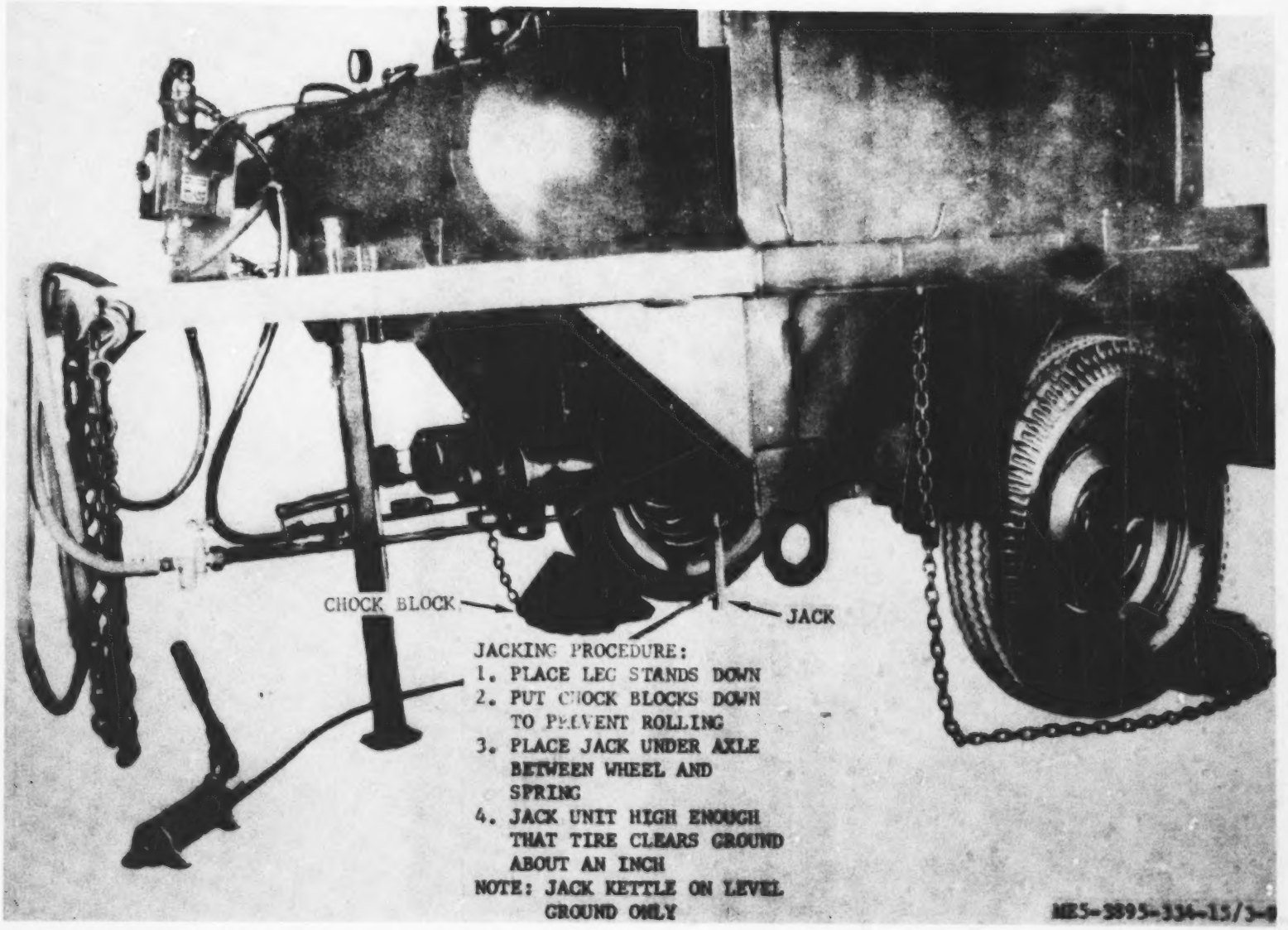
CHOCK BLOCK
JACK
JACKING PROCEDURE:
1. PLACE LEG STANDS DOWN
2. PUT CHOCK BLOCKS DOWN TO PREVENT ROLLING
3. PLACE JACK UNDER AXLE BETWEEN WHEEL AND SPRING
4. JACK UNIT HIGH ENOUGH THAT TIRE CLEARS GROUND ABOUT AN INCH
NOTE: JACK KETTLE ON LEVEL GROUND ONLY
ME5-3895-334-15/5-9

Figure 5-9. Kettle jacking procedures.

3-25. Wheels and Tires

a. Refer to figure 3-9 for proper placement of jack and chock blocks.

b. Refer to figure 3-10 for wheel, removal and installation.

c. Refer to figure 3-10 for tire, tube, and flap, removal and installation.

d. Refer to figure 3-11 for hub, removal and installation.

e. Lubricate the bearings with the lubricant specified in the current lubrication order. Rotate the bearing rollers while working the lubricant to the bearing cup surfaces. Pack a small amount of lubricant into each cup area of the hub. Lubricate the seal edge of the seal very sparingly before it is installed.

f. Refer to figure 3-12 for wheel bearing adjustment.

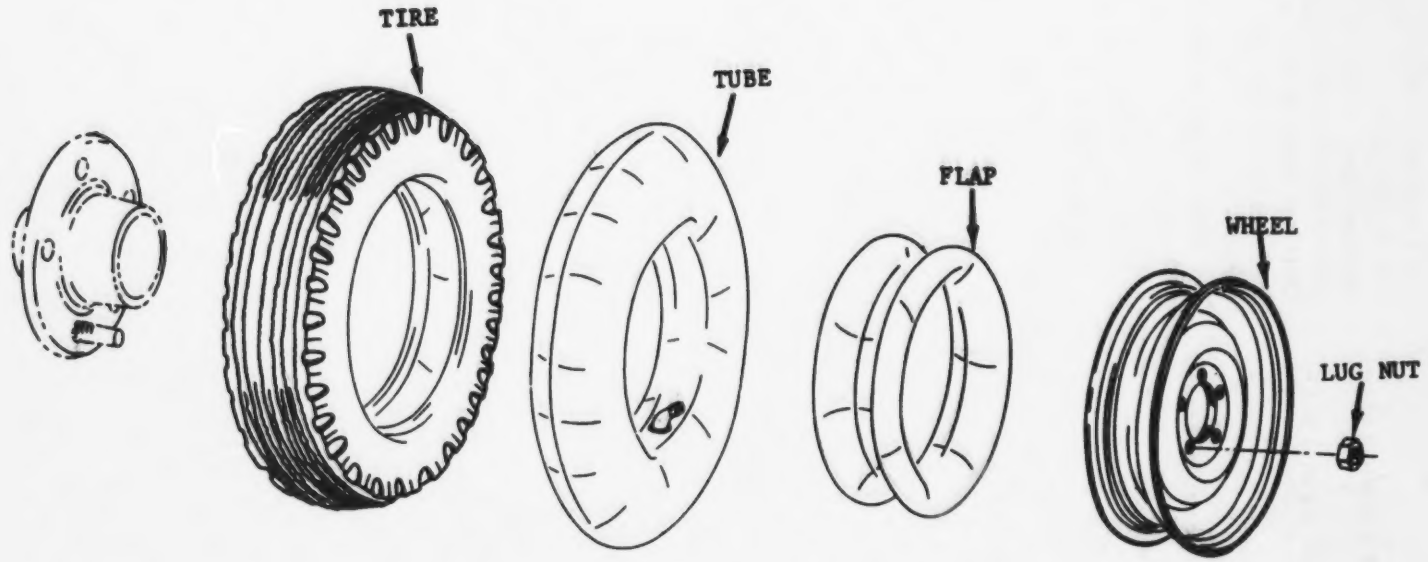

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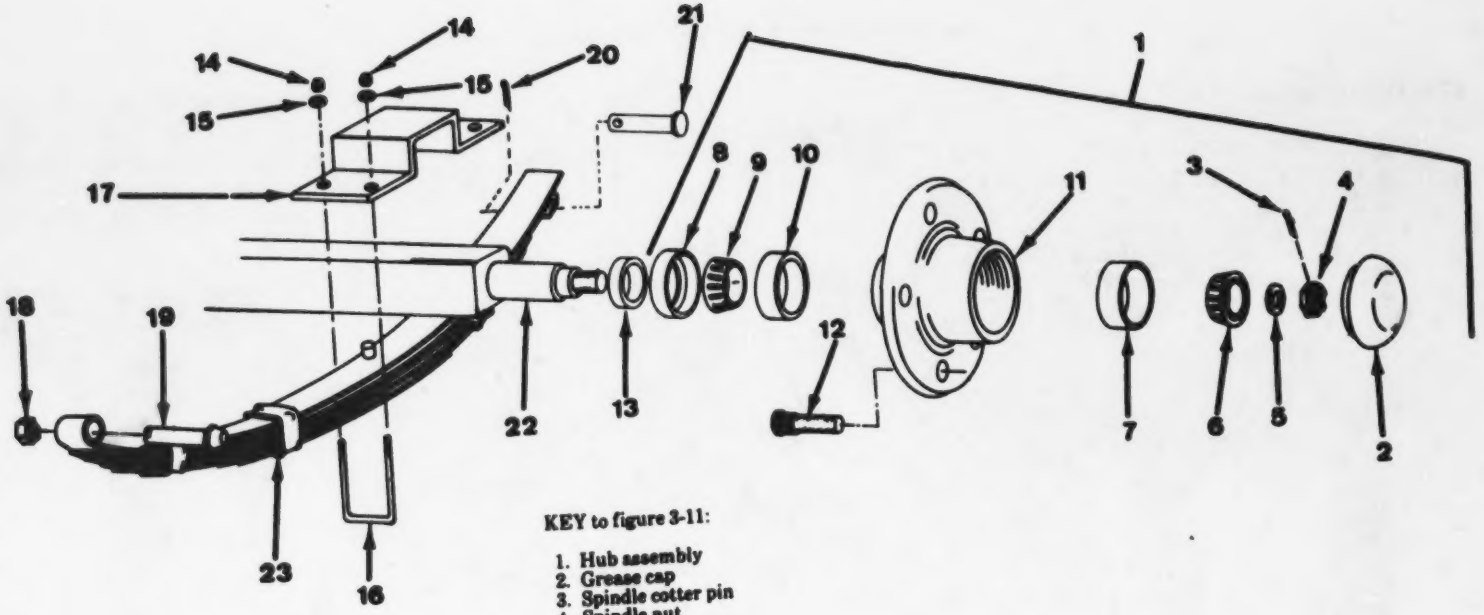
Figure 3-10. Tires, tube, wheel removal.



KEY to figure 3-11:

1. Hub assembly
2. Grease cap
3. Spindle cotter pin
4. Spindle nut
5. Spindle washer
6. Outer cone bearing
7. Outer cup bearing
8. Grease seal
9. Inner cone bearing
10. Inner cup bearing
11. Wheel mtg hub
12. Wheel stud
13. Grease seal seat
14. U-bolt nut
15. Lockwasher
16. U-bolt
17. Clamp
18. Hexagon locknut
19. Hexagon head bolt
20. Cotter pin
21. Spring rivet
22. Axle
23. Leaf type spring

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Figure 3-11. Hub, axle and spring, removal.

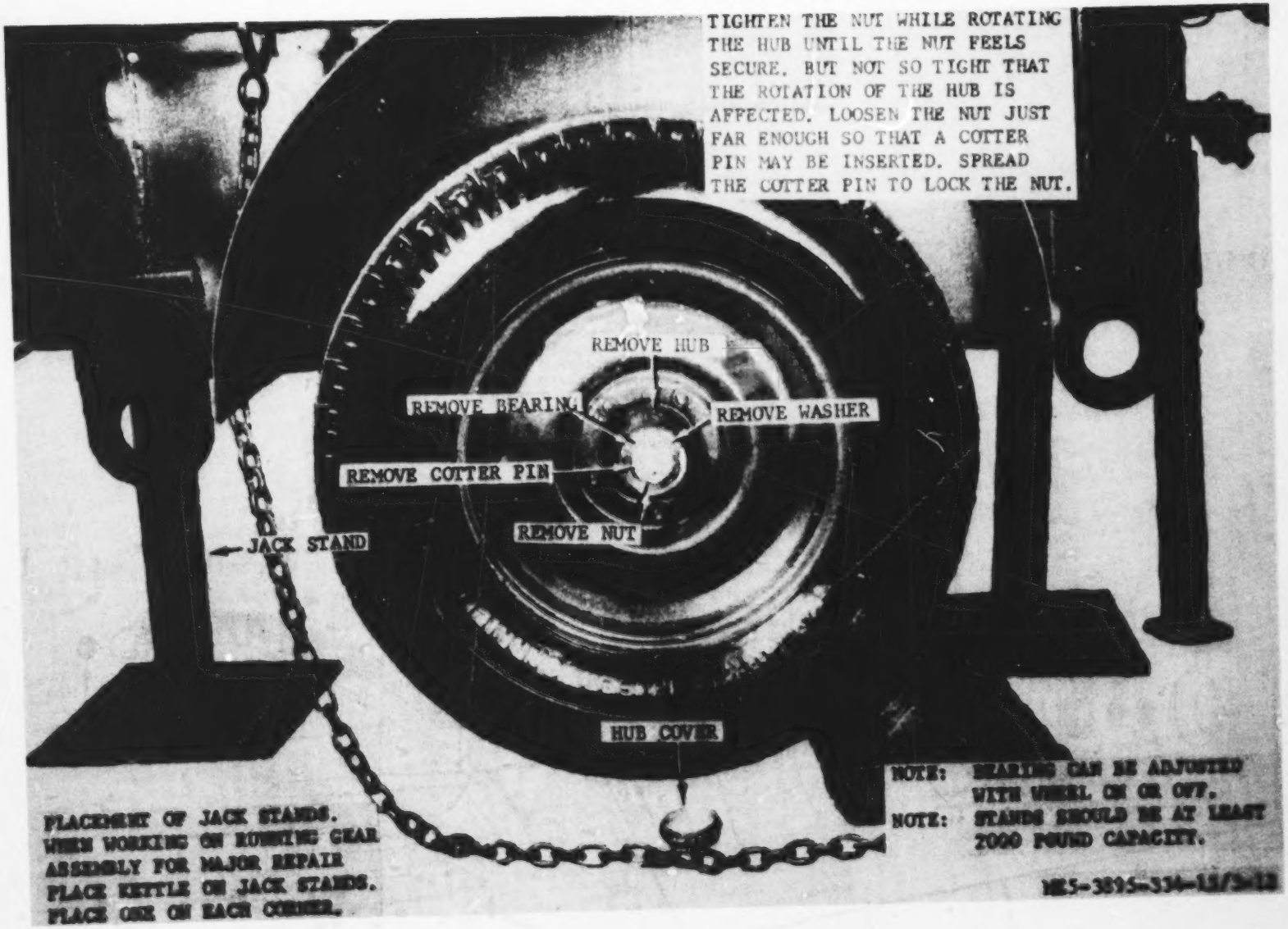
TIGHTEN THE NUT WHILE ROTATING THE HUB UNTIL THE NUT FEELS SECURE. BUT NOT SO TIGHT THAT THE ROTATION OF THE HUB IS AFFECTED. LOOSEN THE NUT JUST FAR ENOUGH SO THAT A COTTER PIN MAY BE INSERTED. SPREAD THE COTTER PIN TO LOCK THE NUT.
REMOVE HUB
REMOVE BEARING
REMOVE WASHER
REMOVE COTTER PIN
REMOVE NUT
JACK STAND
HUB COVER
NOTE: BEARING CAN BE ADJUSTED WITH WHEEL ON OR OFF.
NOTE: STANDS SHOULD BE AT LEAST 2000 POUND CAPACITY.
PLACEMENT OF JACK STANDS.
WHEN WORKING ON RUNNING GEAR ASSEMBLY FOR MAJOR REPAIR PLACE KETTLE ON JACK STANDS. PLACE ONE ON EACH CORNER.

Figure 3-12. Wheel bearing adjustment, and jack stand placement.

3-26. Leg Stands

Refer to figure 3-13 for leg stands, removal and installation.

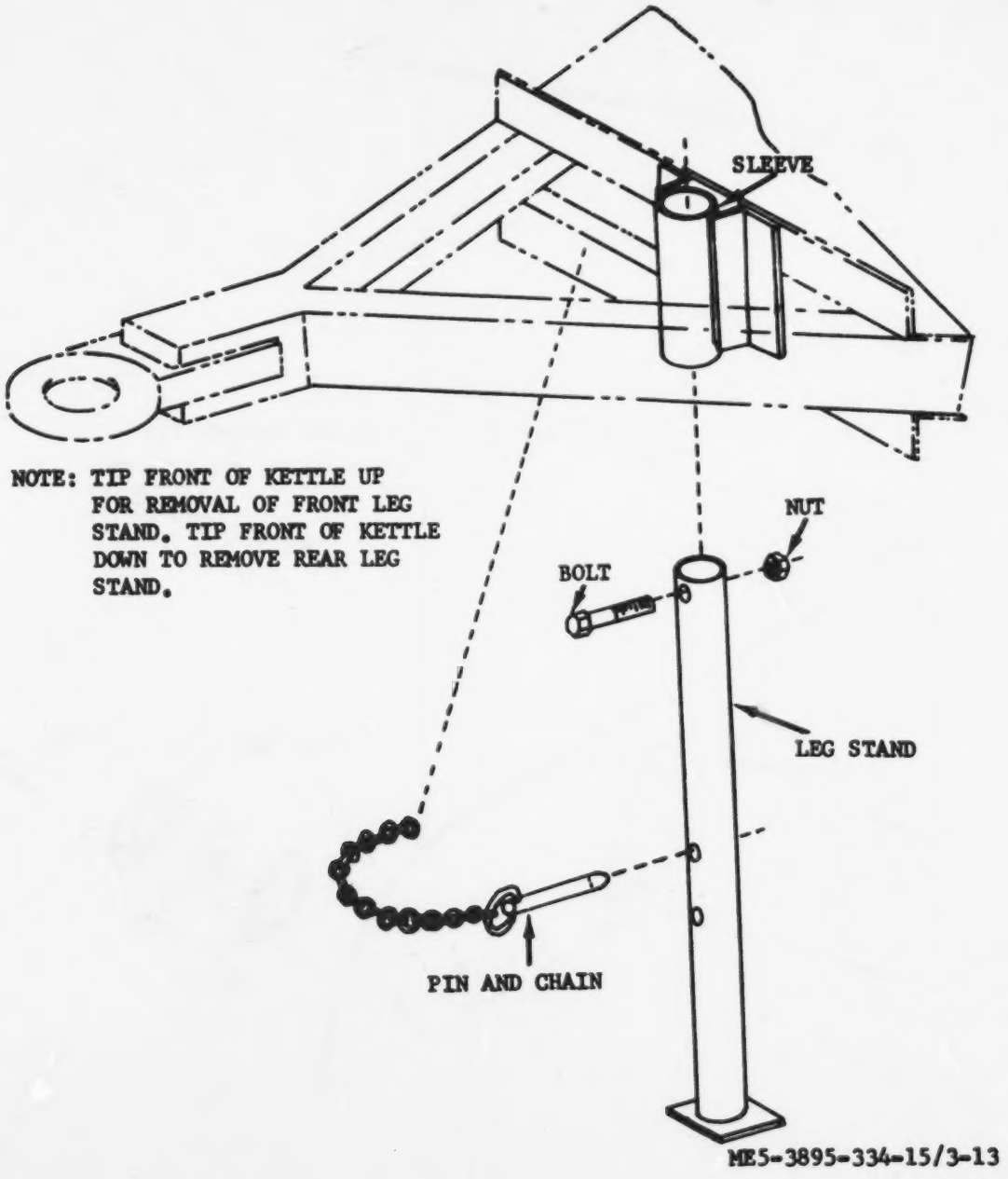
SLEEVE
NOTE: TIP FRONT OF KETTLE UP FOR REMOVAL OF FRONT LEG STAND. TIP FRONT OF KETTLE DOWN TO REMOVE REAR LEG STAND.
NUT
BOLT
LEG STAND
PIN AND CHAIN
ME5-3895-334-15/3-13

Figure 3-13. Leg stands, removal and installation.

3-27. Springs

a. Jack the kettle per instructions on figure 3-9 and remove the wheel.

b. Refer to figure 3-11 for shackle bolt, removal and installation.

3-28. Reflectors

Refer to figure 3-14 for reflector, removal and installation.

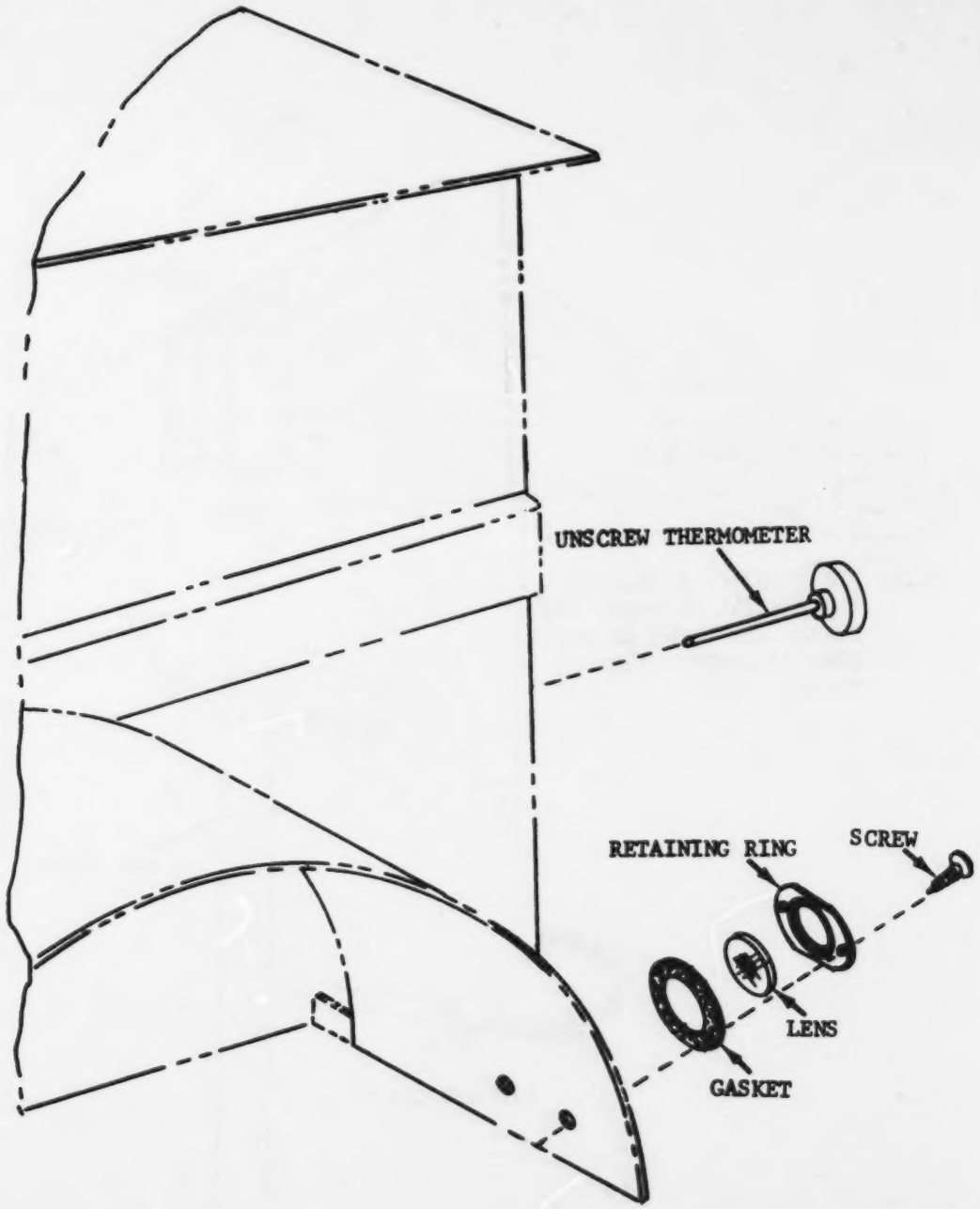

Figure 3-14. Reflectors and thermometer, removal and installation.

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3-29. Thermometer

Refer to figure 3-14 for thermometer, removal and installation.

3-30. Pressure Gage

Refer to figure 3-20 for pressure gage, removal and installation.

3-31. Pump Assembly

a. Refer to step 3, figure 3-7, for clutch assembly and clutch shifter, removal and installation.

b. Refer to sheet 1 of figure 3-15 for piping, removal and installation.

c. Refer to sheet 2 of figure 3-15 for pump assembly, removal and installation.

d. Refer to figure 3-16 for pump gasket replacement.

e. Refer to figure 3-16 for pump packing nut, and packing replacement.

f. Refer to figure 3-16 for pump pressure relief valve replacement.

g. Refer to figure 3-17 for pump pressure relief valve adjustment.

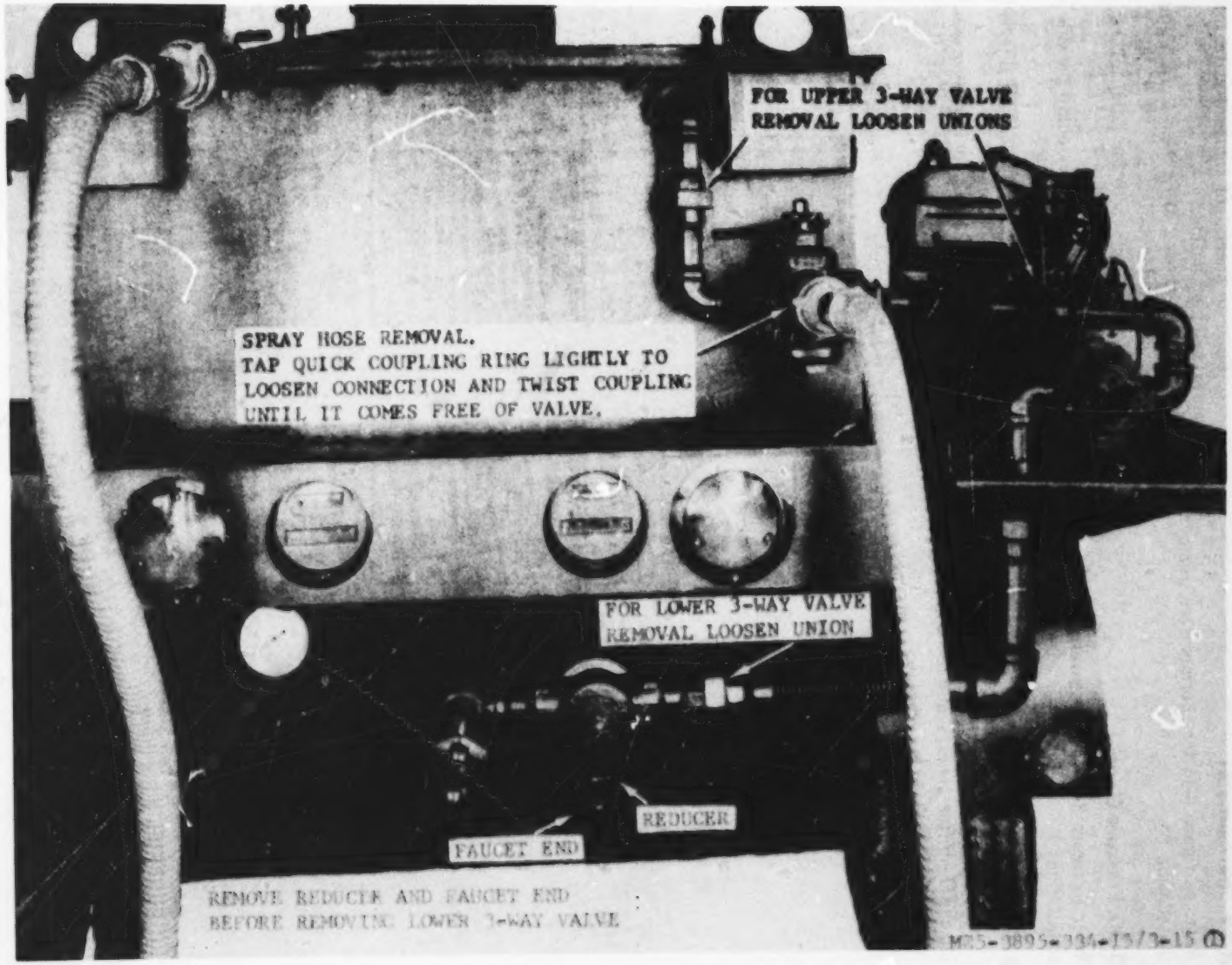


Figure 3-15. Piping, three-way valve, spray hose, and pumps, removal and installation (sheet 1 of 2).

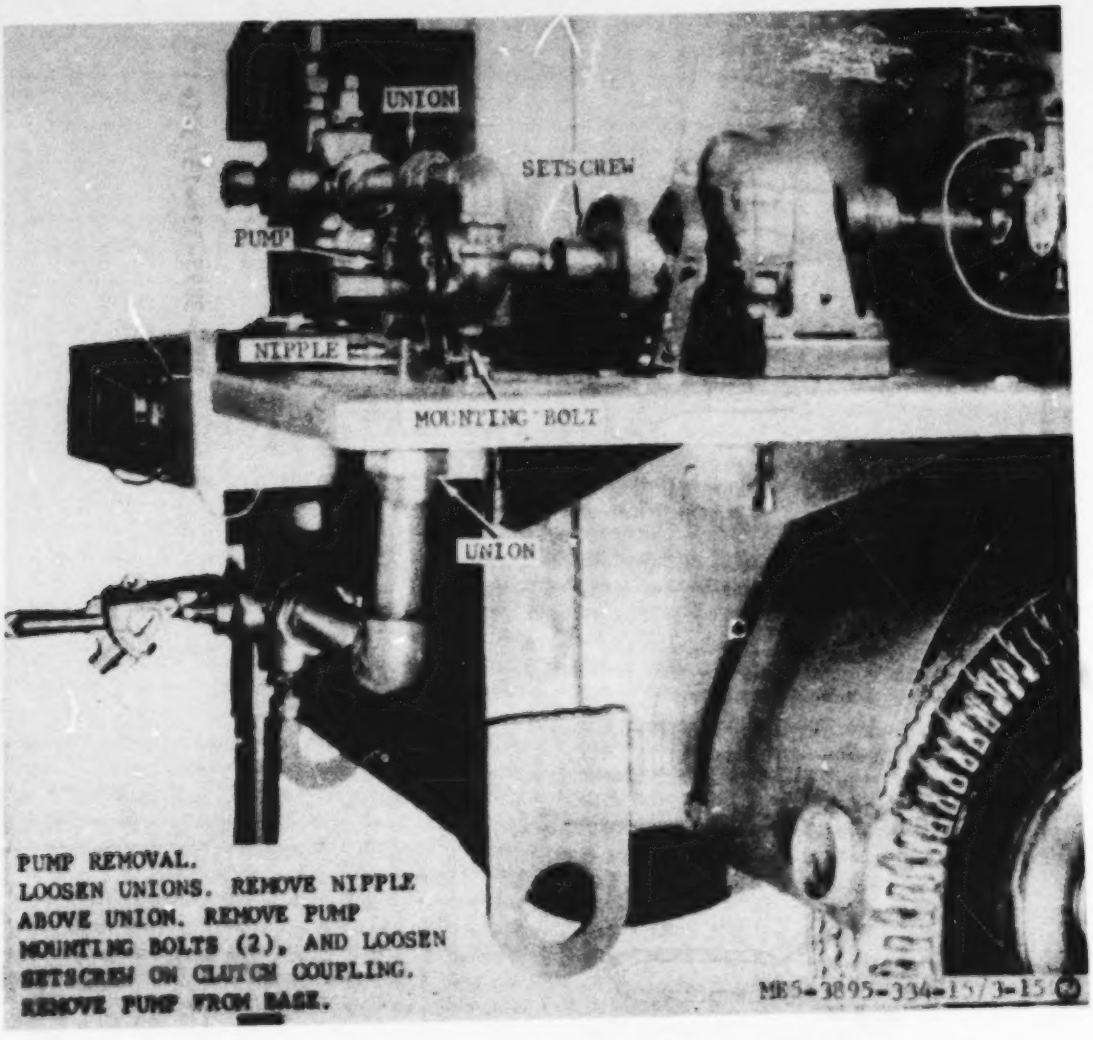
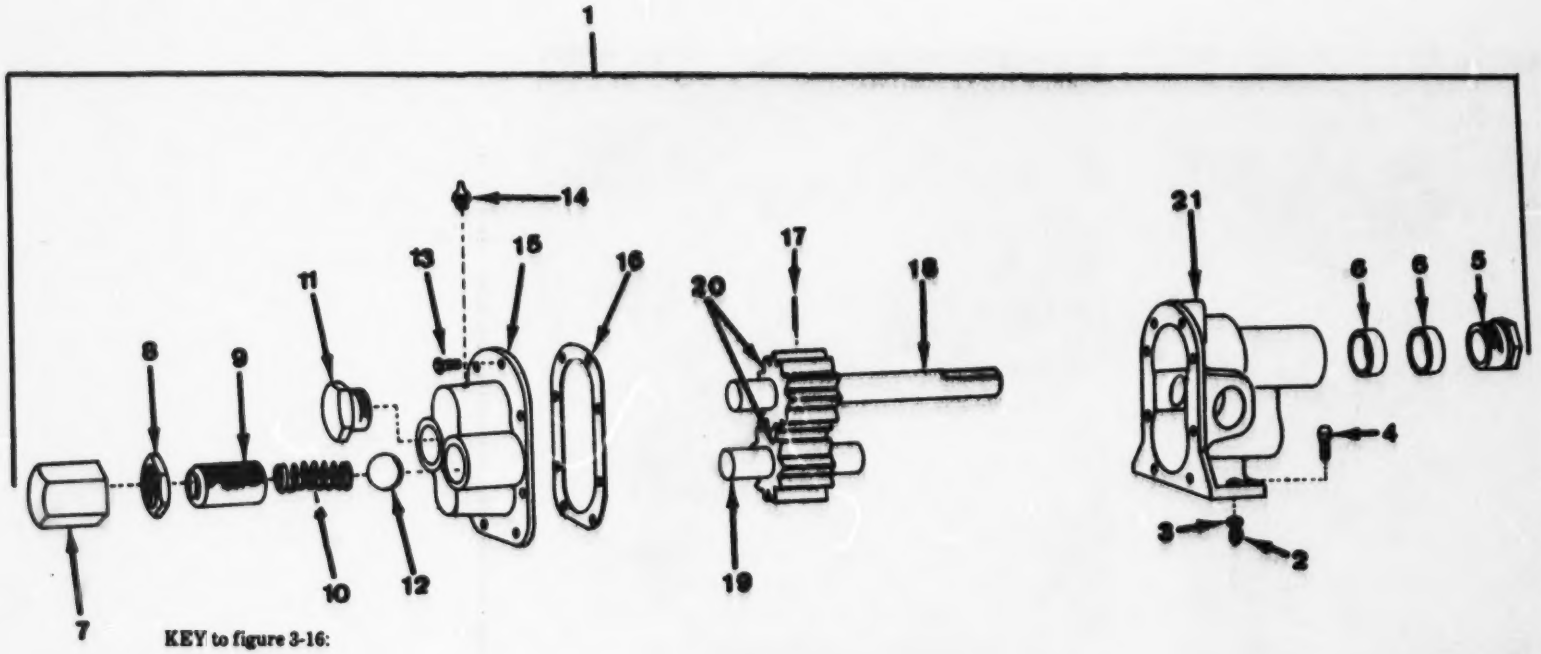


Figure 3-15. Piping, three-way valve, spray hose and pump, removal and installation (sheet 2 of 2).



KEY to figure 3-16:

1. Bitumen pump
2. Hexagon steel nut
3. Lockwasher
4. Hexagon head capscrew
5. Packing nut
6. Packing ring
7. Bypass nut
8. Locknut
9. Adjusting screw
10. Bypass valve spring
11. Bypass plug nut
12. Stainless steel ball
13. Cover screw
14. Lubrication fitting
15. Cover
16. Cover gasket
17. Gear to shaft pin
18. Drive shaft
19. Idler shaft
20. Pump gear
21. Body pump

MR5-3895-334-15/3-16

Figure 3-16. Pump, disassembly and reassembly.

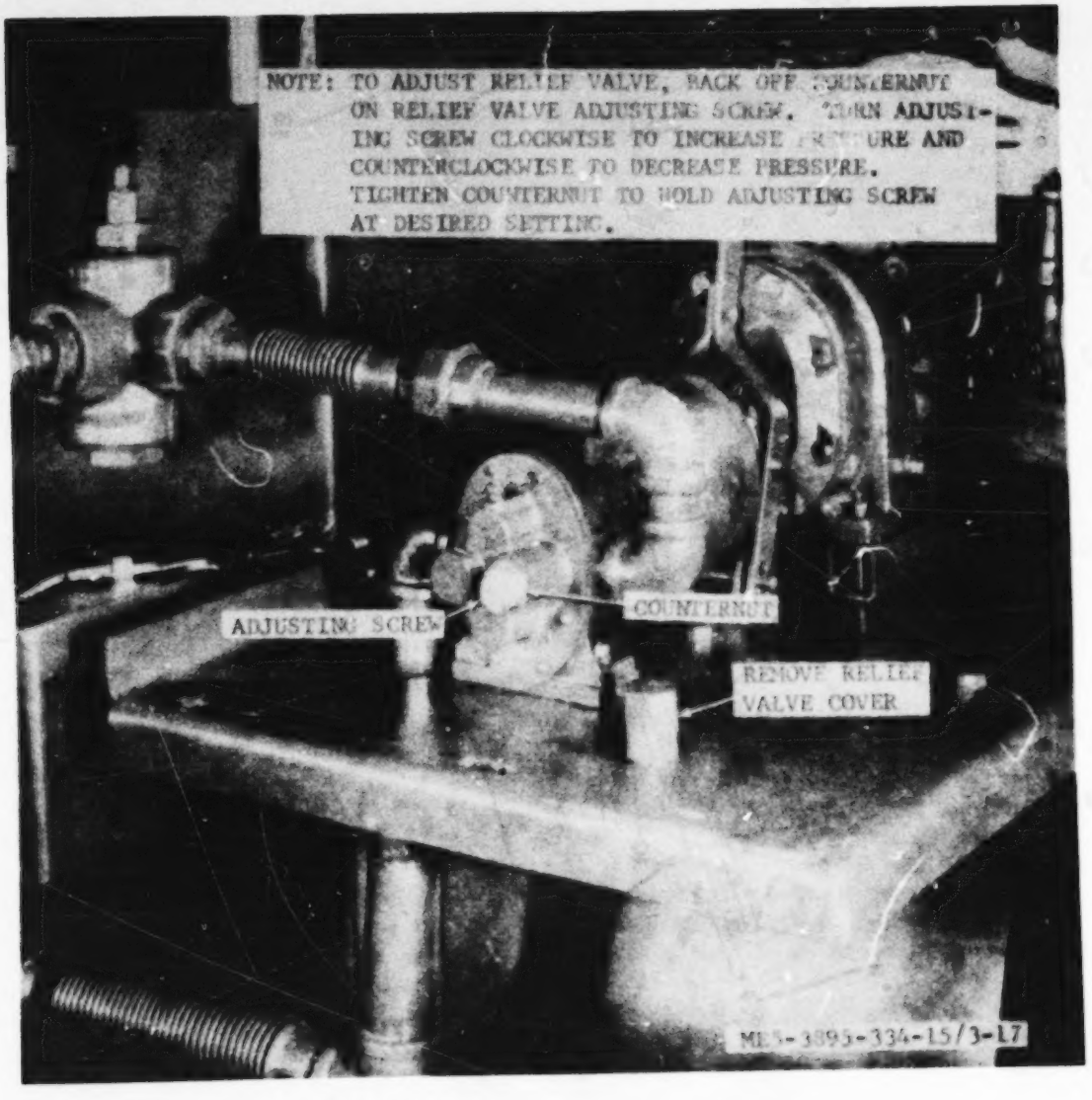

NOTE: TO ADJUST RELIEF VALVE, BACK OFF COUNTERNUT ON RELIEF VALVE ADJUSTING SCREW. TURN ADJUSTING SCREW CLOCKWISE TO INCREASE PRESSURE AND COUNTERCLOCKWISE TO DECREASE PRESSURE. TIGHTEN COUNTERNUT TO HOLD ADJUSTING SCREW AT DESIRED SETTING.
ADJUSTING SCREW
COUNTERNUT
REMOVE RELIEF VALVE COVER
ME 5-3895-334-15/3-17

Figure 3-17. Pump pressure relief valve adjustment.

3-32. Piping System

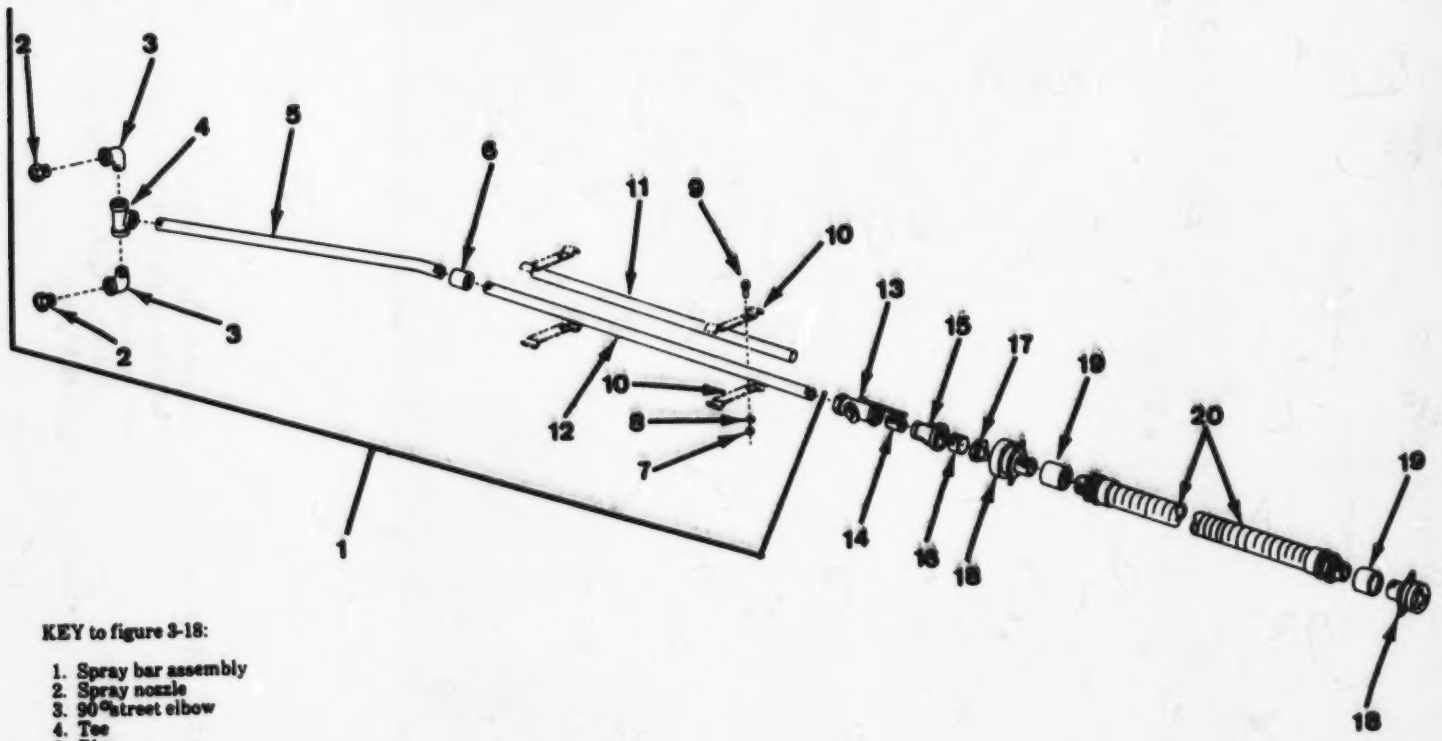
Refer to sheet 1 of figure 3-15 for three-way valve, removal and installation.

3-33. Spray Bar and Hose Assembly

a. Refer to sheet 1 of figure 3-15 for hose assembly, removal and installation.

b. Refer to figure 3-18 for shutoff valve, removal and installation.

c. Refer to figure 3-18 for spray nozzle, removal and installation.



KEY to figure 3-18:

1. Spray bar assembly
2. Spray nozzle
3. 90° street elbow
4. Tee
5. Pipe
6. Pipe coupling
7. Hexagon nut
8. Lockwasher
9. Hexagon head capscrew
10. Handle bracket
11. Handle
12. Pipe
13. Shutoff valve
14. Nipple
15. Reducer
16. Nipple
17. Faucet end
18. Hose end
19. Pipe coupling
20. Hose

ME5-3895-334-15/3-18

Figure 3-18. Spray bar, assembly and disassembly.

3-34. Fusible Link

Refer to figure 3-19 for fusible link, removal and installation.

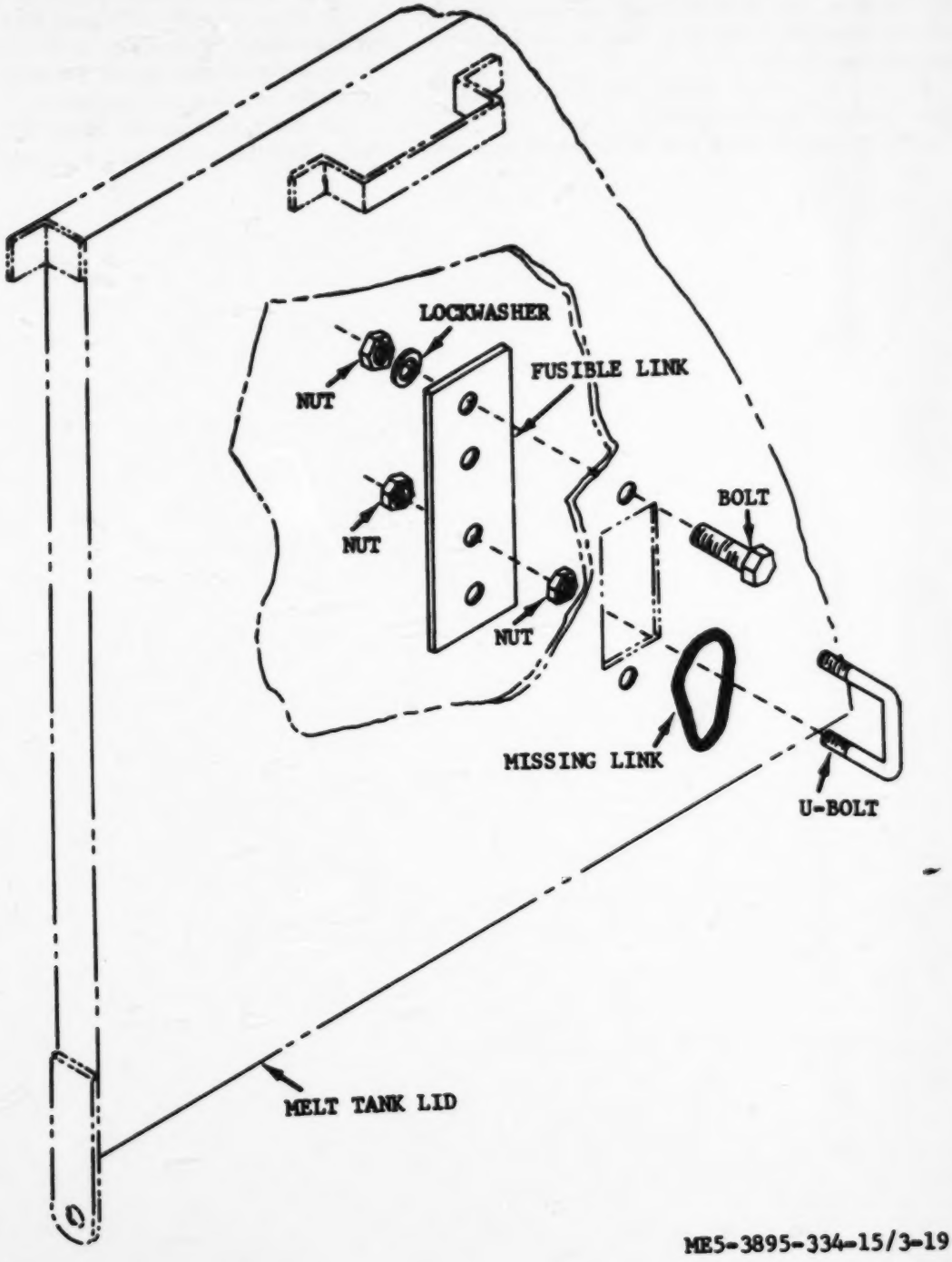


Figure 3-19. Fusible link, removal and installation.

3-35. Fuel System (Burner)

a. Refer to item 26, figure 3-20, for air pump, removal and installation; also, disassembly and reassembly of air pump.

b. Refer to item 21, figure 3-20, for tank pressure relief valve, removal and installation.

c. Refer to item 15, figure 3-21, for burner assembly, removal and installation; also, burner disassembly and reassembly.

d. Refer to item 17, figure 3-20, for fuel shutoff valve, removal and installation.

e. Refer to figure 3-20, item 10, for line Y-strainer, removal and installation; also, Y-strainer disassembly and reassembly. Clean screen when Y-strainer is disassembled.

f. For burner thermostatic control, removal and installation, refer to (1) thru (3), below.

(1) Refer to item 39, figure 3-21, for thermal sensing element, removal and installation.

(2) Refer to items 8 and 4, figure 3-20, for fuel and air line, removal and installation.

(3) Refer to item 43, figure 3-21, for burner thermostatic control, removal and installation.

KEY to figure 3-20:

1. Hose swivel nipple
2. Male adapter
3. Hose nipple
4. Rubber hose
5. 90°elbow
6. Nipple
7. Hose clamp
8. Rubber neoprene hose
9. Hose nipple
10. Y-type strainer
11. Cap strainer
12. Gasket strainer
13. Screen strainer
14. Body strainer
15. Nipple
16. 90°elbow
17. Shutoff fuel valve
18. Fuel burner tank assembly
19. Air pressure gage
20. 90°street elbow
21. Pressure relief valve
22. Nipple
23. Fill brass cap
24. Nipple
25. Fuel burner tank
26. Air pump assembly
27. Cap barrel
28. Hexagon steel nut
29. Lockwasher
30. Inner cup washer
31. Leather cup
32. Upper cup washer
33. Cushion spring
34. Pump rod
35. Machine screw
36. Square steel nut
37. Safety chain
38. Hose clamp
39. Check valve cap
40. Check valve spring
41. Check valve disc
42. Air pump barrel
43. Hexagon steel nut
44. Lockwasher
45. Hexagon head capscrew

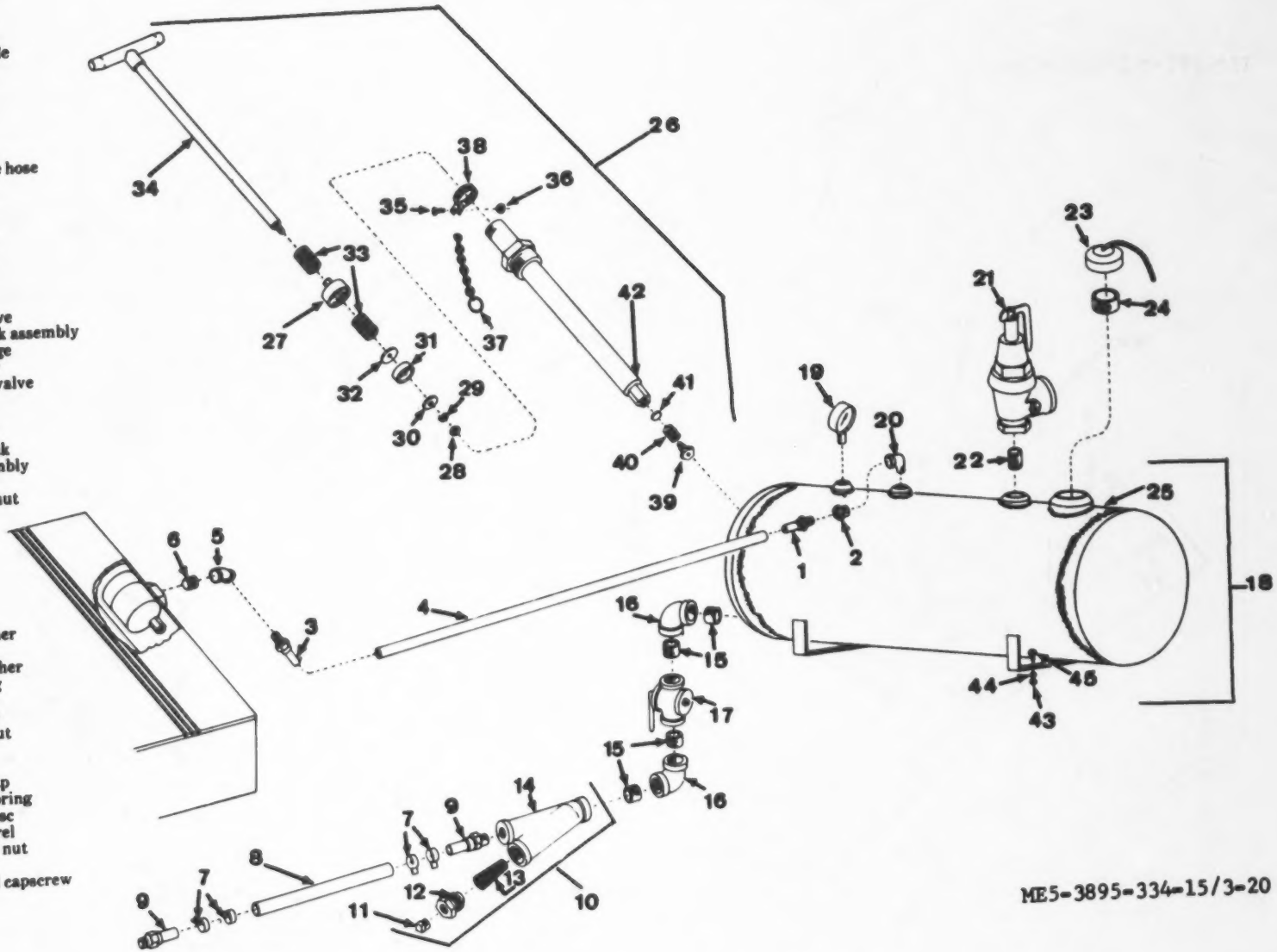


Figure 20. Air pump, shutoff valve, and line strainer, assembly and disassembly.

KEY to figure 3-21:

1. Hose clamp
2. Rubber neoprene hose
3. Hose nipple
4. Strainer needle valve
5. Strainer plug
6. Strainer gasket
7. Strainer screen
8. Handle nut
9. Handle
10. Packing nut
11. Valve stem
12. Packing ring
13. Coupling nut
14. Piece tail
15. Burner assembly
16. Brass packing nut
17. Wind shield
18. Hexagon head capscrew
19. Brass plug
20. Burner jet
21. Burner body
22. Burner frame
23. Pipe coupling
24. Handle
25. Square steel nut
26. Handle grip
27. Machine screw
28. Hose
29. Hexagon steel nut
30. U-bolt
31. Pipe tee
32. Rubber neoprene hose
33. 90° elbow
34. Close nipple
35. Round head screw
36. Lockwasher spring
37. Throttling valve
38. Machine capscrew
39. Thermal sensing element
40. Lockwasher
41. Retaining plug clip
42. Hexagon head capscrew
43. Temperature control assembly
44. Binder head screw
45. Cover
46. Gasket
47. Brass nut
48. Brass ferrule
49. Copper tubing
50. Male adapter
51. Flat head screw
52. Relief valve
53. Controller mtg bracket

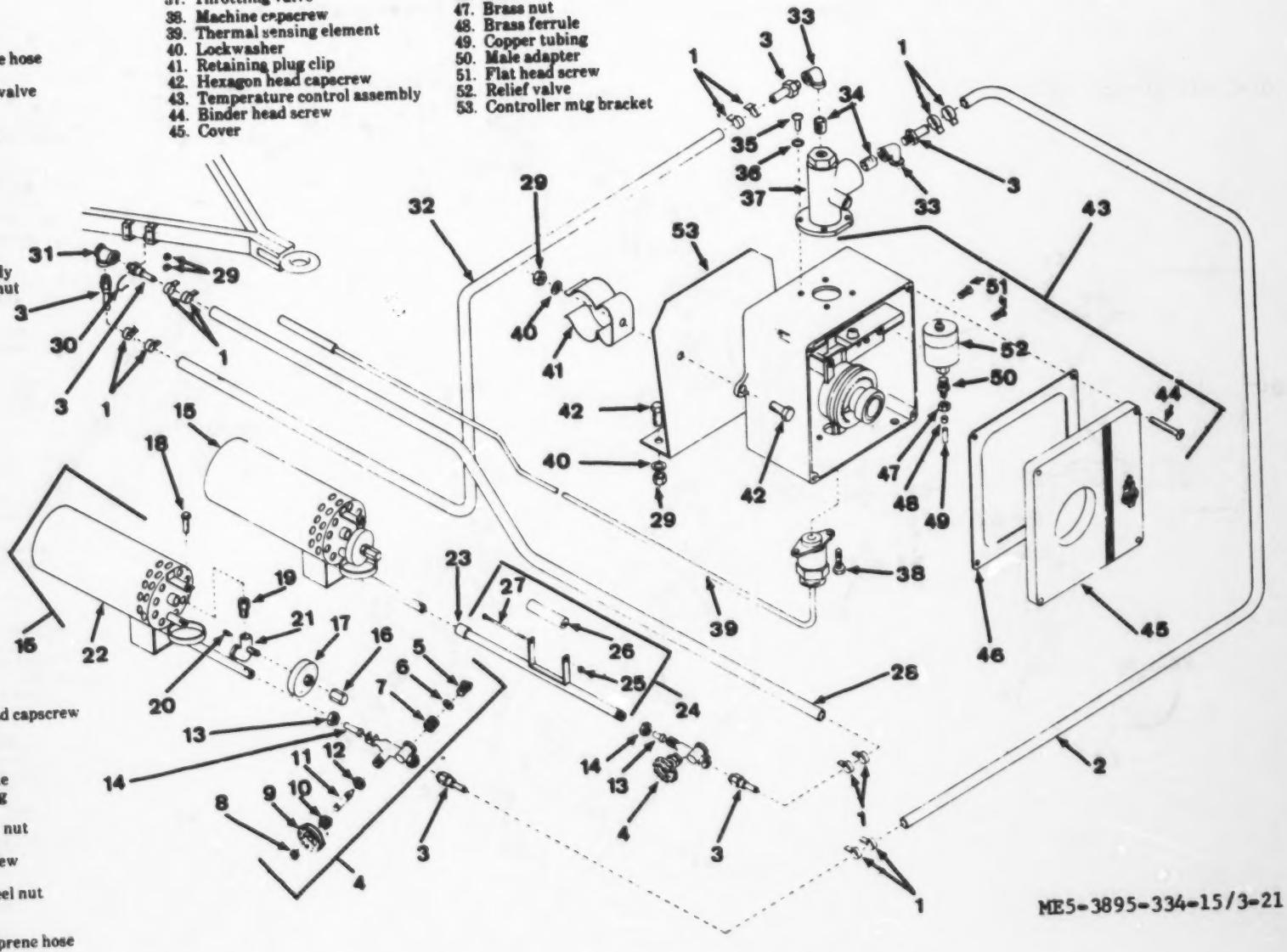


Figure 3-21. Burner fuel line and thermal sensing element, assembly and disassembly.

CHAPTER 4
SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

4-1. Preparation of Equipment for Shipment

a. General. When preparing the heating kettle for shipment, an inspection must be made to see that the unit is in a good state of repair and can be put into immediate operation upon arrival.

b. Preparation.

(1) Prepare the engine for shipment in accordance with the instructions in TM 5-2805-256-14.

(2) Remove and separately pack the following components:

(a) Fuel hose assembly, spray hose, and spray bar assembly.

(b) Drawoff valve.

(c) Thermometer.

(d) Thermostatic control.

(3) Clean all surfaces with an approved cleaning solvent and dry thoroughly.

(4) Refer to the basic issue items list (appen. B). All items listed are on or with the heating kettle and in serviceable condition.

(5) Refer to TM 740-90-1 for preservation, packing, and shipping instructions.

4-2. Loading the Equipment for Shipment

a. Ramp Loading. Provide a suitable ramp at the end of the carrier. Position the bitumen heating kettle on the bed of the carrier by means of another vehicle.

b. Sling Loading. Attach slings to the two front and two rear lifting eyes. Use a suitable hoist and lift the bitumen heating kettle to the bed of the carrier. Position it for tiedown and remove the slings.

Warning: **DO NOT USE A LIFTING DEVICE OF LESS THAN A 2,000-POUND CAPACITY. DO NOT ALLOW THE HEATING KETTLE TO SWING BACK AND FORTH WHEN IT IS SUSPENDED. FAILURE TO OBSERVE THIS WARNING CAN RESULT IN DAMAGE TO THE EQUIPMENT AND SEVERE INJURY OR DEATH TO PERSONNEL.**

c. Tiedown. Place blocks in front and in back of each wheel. Attach tiedown wires to the four tiedown eyes and secure the wires to the bed of the carrier.

4-3. Preparation of Equipment for Storage

a. Definition. Limited storage is defined as a period not to exceed 6 months.

b. Inspection. Make a complete inspection of the bitumen heating kettle as described in paragraph 2-1. Correct or report all discrepancies noted to field maintenance.

c. Preservation. Equipment in limited storage will be given only limited preservation as specified hereinafter; also, the following operations will be performed:

(1) *Cleaning and drying.* Prior to the application of any preservative or paint, thoroughly clean all surfaces to be coated with an approved cleaning solvent. Exercise care in cleaning so that the electrical circuits and components are not damaged. After cleaning, and before applying the preservatives, all surfaces and parts will be thoroughly dried.

(2) *Painting.* Remove all rust, corrosion, and scale from the surfaces to be painted. Refer to TM 9-213 for detailed painting instructions.

(3) *Engine.* Refer to TM 5-2805-256-14 for preservation of the engine.

(4) *Tires.* Inflate the tires to 45 psi. Raise and block the heating kettle so that no weight will rest on the tires.

(5) *Weatherproofing.* A waterproof cover must be provided to protect the bitumen heating kettle if stored outside. Seal all openings such as the burner nozzle, stack, and spray nozzle, to prevent foreign matter from entering.

d. Lubrication. Lubricate the heating kettle in accordance with the current lubrication order.

4-4. Inspection and Maintenance of Equipment in Storage

a. Inspection. When equipment has been placed in storage, all scheduled preventive maintenance services, including inspection, will be suspended and preventive maintenance inspection will be performed

as specified herein. Refer to AR 743-505.

b. Worksheet and Preventive Maintenance. DA Form 2404 (Equipment Inspection and Maintenance Worksheet) will be executed on each major item of equipment when equipment is initially placed in limited storage and every 30 days thereafter. Required maintenance will be performed promptly to insure that the equipment is mechanically sound and ready for immediate use.

c. Operation. Equipment is limited storage must be operated long enough to bring it up to operating temperature and for complete lubrication of all bearings, gears, and so on, at least every 30 days. Equipment must be serviced and in satisfactory operating condition before it is operated.

Section II. DEMOLITION TO PREVENT ENEMY USE

4-5. General

When capture or abandonment of the bitumen heating kettle to an enemy is imminent, the responsible unit commander must make the decision either to destroy the equipment or to render it inoperative. Based on this decision, orders are issued which cover the desired extent of destruction. Whatever method of demolition is employed, it is essential to destroy the same vital parts of all heating kettles and all corresponding repair parts (TM 750-244-3).

4-6. Demolition to Render the Bitumen Heating Kettle Inoperative

a. Mechanical Means. Use sledge hammers, crowbars, picks, axes, or any other heavy tools which may be available to destroy the following:

(1) Engine block, gear reducer assembly, clutch assembly, and pump assembly.

(2) Upper and lower three-way valves.

(3) Thermostat bulbs, thermostats, gages, and hand pump assembly.

(4) Tires.

Note. The above steps are minimum requirements for this method.

b. Misuse. Drain engine crankcase of all oil and fill with gravel, nuts, bolts, screws, or broken glass, and operate the power spray system.

Note. The above steps are the minimum requirements for this method.

4-7. Demolition by Explosives or Weapons' Fire

a. Explosives. Place as many of the following charges (fig. 4-1) as the situation permits and detonate them simultaneously with detonating cord and suitable detonator.

(1) Place a ½-pound charge on the axle between the left wheel and frame assembly.

(2) Place a ½-pound charge on the gear reducer assembly.

(3) Place a ½-pound charge between the burner air pressure tank and the outer shell.

(4) Place a ½-pound charge on the axle between the right wheel and frame assembly.

b. Weapons' Fire. Fire on the heating kettle with the heaviest practical weapons available.

4-8. Other Demolition Methods

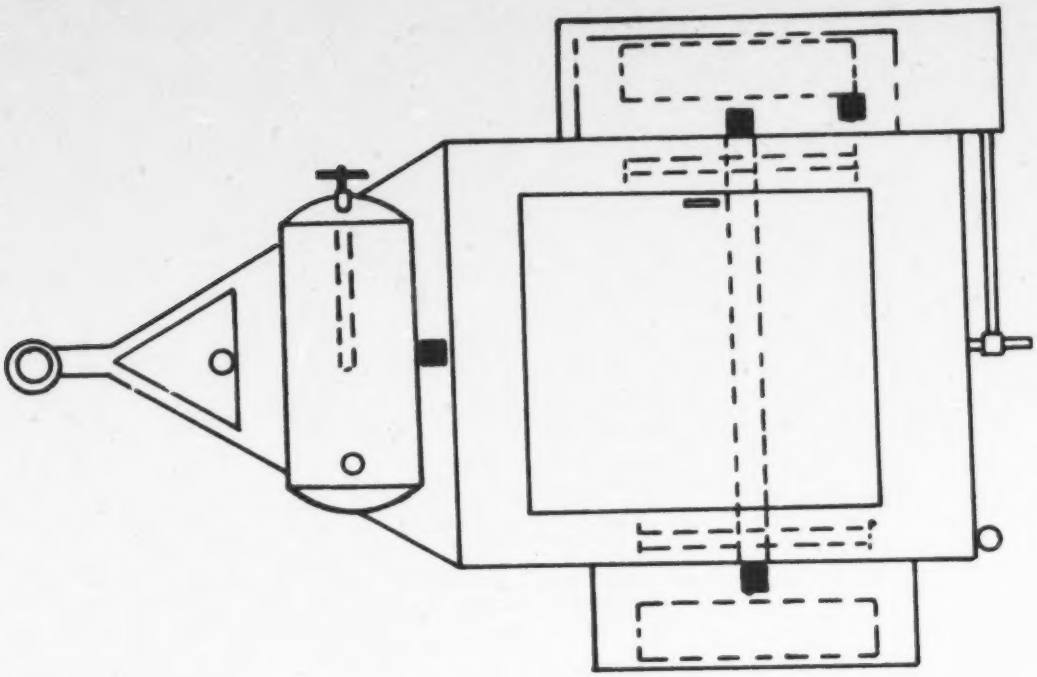
a. Scattering and Concealment. Remove all easily accessible parts, such as the engine, three-way valves, gages, burner assembly, and spray bar assembly and scatter them through dense foliage, bury them in dirt and sand, or throw them in a lake, stream, or other body of water.

b. Burning. Pack rags, clothing, or canvas under and around the unit. Saturate this packing with gasoline, oil, or diesel fuel, and ignite.

c. Submersion. Totally submerge the unit in a body of water to provide water damage and concealment. A body of salt water will do greater damage to metal parts than submersion in a body of fresh water.

4-9. Training

All operators should receive thorough training in the destruction of the heating kettle. Simulated destruction, using all the methods listed above, should be included in the operator training program. It must be emphasized in training, that demolition operations are usually necessitated by critical situations when time available for carrying cut destruction is limited. For this reason, it is necessary that operators be thoroughly familiary with all methods of destruction of equipment and be able to carry out demolition instructions without reference to this or any other manual.



LEGEND:

■ ½ POUND CHARGE

ME5-3895-334-15/4-1

Figure 4-1. Placement of charges.

CHAPTER 5
DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE INSTRUCTIONS

Section I. GENERAL

5-1. Scope

a. The following instructions are provided for the use of field and depot maintenance personnel. They contain information on the maintenance of the equipment which is beyond the scope of the tools, equipment, personnel, or supplies normally available to organizational maintenance facilities.

b. Appendix A contains a list of all publications applicable to field and depot maintenance facilities for this equipment. Appendix C contains the maintenance allocation chart. Appendix B contains the basic issue items list.

5-2. Forms and Records

DA Forms and procedures used for equipment maintenance will only be those prescribed by TM 38-750 (Army Equipment Record Procedures).

Section II. DESCRIPTION AND DATA

5-3. Description

Refer to paragraph 1-3 for a complete description of the heating kettle.

5-4. Field and Depot Maintenance Tabulated Data

a. Refer to TM 5-2805-256-14 for engine tabulated data.

b. Refer to paragraph 1-6 for kettle tabulated data.

Section III. REPAIR PARTS, SPECIAL TOOLS AND EQUIPMENT

5-5. Special Tools and Equipment

No special tools or equipment are required to maintain or repair the heating kettle.

5-6. Direct Support, General Support, and Depot Maintenance Repair Parts

Direct support, general support, and depot maintenance repair parts are listed and illustrated in TM 5-3895-334-25P.

5-7. Specially Designed (Fabricated) Tools and Equipment

No specially designed tools or equipment are required to maintain or repair the heating kettle.

Section IV. TROUBLESHOOTING

5-8. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the heating kettle or any of its components. Table 5-1 lists trouble symptoms, list of probable causes and possible remedies recommended. Refer to TM 5-2805-256-14 for engine troubleshooting.

Table 5-1. Troubleshooting

Malfunction	Probable cause	Corrective action
1. Pump fails to operate or operates improperly.	a. Relief valve spring improperly adjusted or broken.	a. Adjust or replace relief valve spring (para. 5-19).
	b. Drive pin sheared.	b. Replace drive pin (para 5-19). Inspect gear and drive shaft for wear or damage, and replace if necessary.
	c. Gears worn or broken.	c. Replace gears (para. 5-19).
	d. Gasket defective.	d. Replace gasket (para. 5-19).
	e. Packing defective.	e. Replace packing (para. 5-19).
2. Clutch fails to operate or operates improperly.	a. Worn or damaged shifter collar.	a. Replace shifter collar (para. 5-20).
	b. Worn or damaged wedge sleeve.	b. Replace wedge sleeve (para. 5-20).
	c. Lever rollers worn or damaged.	c. Replace lever rollers (para. 5-20).
	d. Driving plate worn or damaged.	d. Replace driving plate (para. 5-20).
3. Gear reducer fails to operate or operates improperly.	a. Seal leaking lubricant.	a. Replace seal (fig. 5-1) (para. 5-12).
	b. Gasket leaking lubricant.	b. Replace gasket (fig. 5-1) (para. 5-12).
	c. Bearing damaged or worn.	c. Replace bearing (fig. 5-1) (para. 5-12).
	d. Gears damaged or worn.	d. Replace gears (fig. 5-1) (para. 5-12).

Section V. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS AND AUXILIARIES

5-9. Engine

Refer to TM 5-2805-256-14 for engine repair.

5-10. Fuel System

Refer to paragraph 3-22 for fuel system, removal and installation.

5-11. Electrical System

Refer to paragraph 3-23 for electrical system, removal and installation.

5-12. Gear Reducer

Refer to paragraph 3-24c for gear reducer assembly, removal and installation. Disassemble and reassemble the gear reducer as shown by figure 5-1.

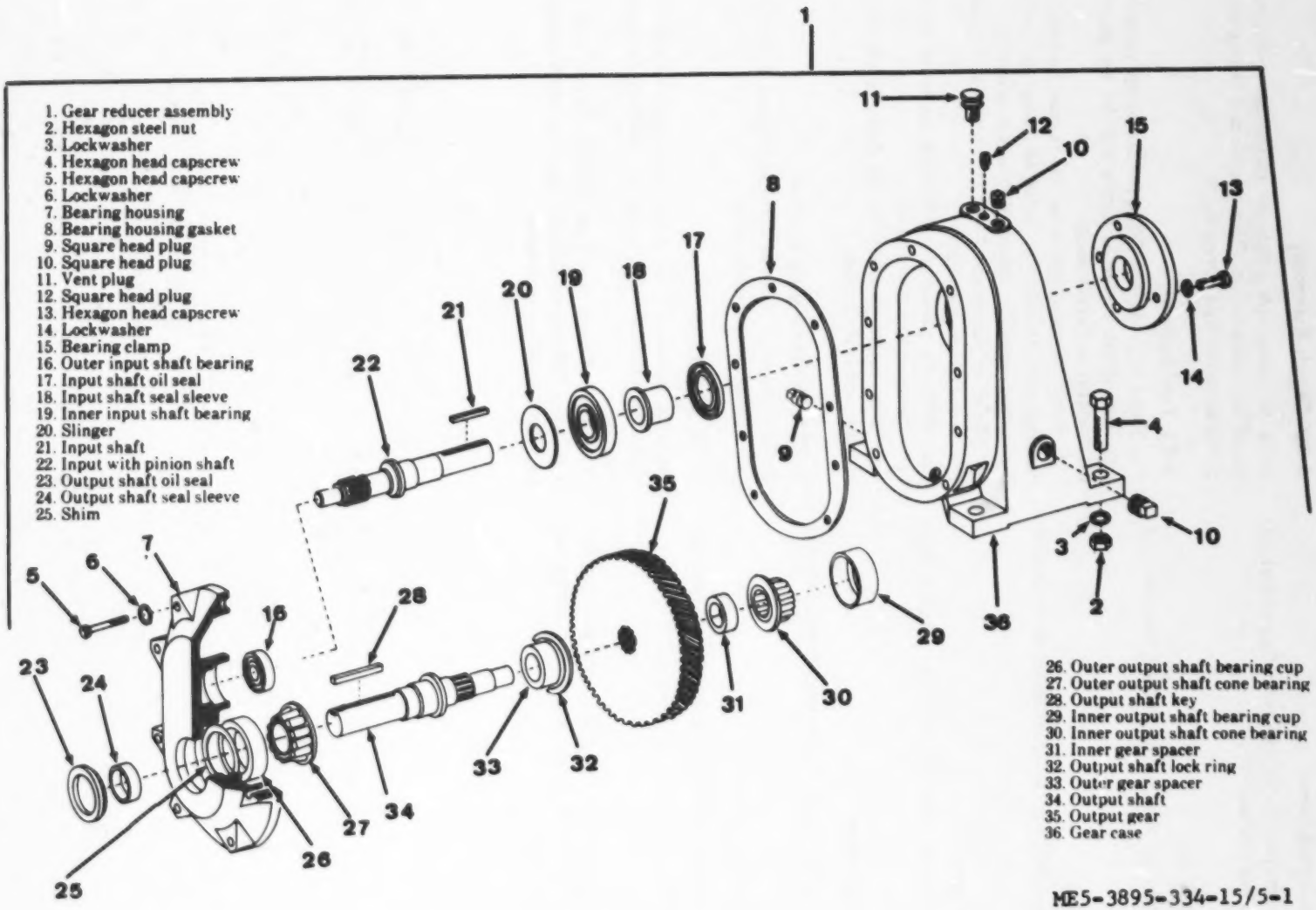


Figure 5-1. Gear reducer, disassembly and reassembly.

5-13. Wheels and Tires

Refer to paragraph 3-25 for tire, tube, flap and wheel, removal and installation.

5-14. Leg Stands

Refer to paragraph 3-26 for leg stands, removal and installation.

5-15. Springs

Refer to figure 3-11 for spring, removal and installation.

5-16. Reflectors

Refer to paragraph 3-28 for reflector, removal and installation.

5-17. Thermometer

Refer to paragraph 3-24 for thermometer, removal and installation.

5-18. Pressure Gage

Refer to paragraph 3-30 for pressure gage, removal and installation.

5-19. Pump

Refer to paragraph 3-31 for pump, removal and installation. Disassemble and reassemble pump as shown by figure 3-16.

5-20. Clutch Assembly

Refer to paragraph 3-24*b* for clutch assembly, removal and installation. Disassemble and reassemble clutch as shown by figure 5-21.

5-21. Fuel System

a. Refer to paragraph 3-35*a* for air pump, removal and installation. Refer to figure 3-20 for air pump, disassembly and reassembly.

b. Refer to paragraph 3-35*c* for burner assembly, removal and installation. Refer to paragraph 3-35*d* for burner assembly, disassembly and reassembly.

c. Refer to paragraph 3-35*g* for thermostatic control, removal and installation.

d. Refer to paragraph 3-35*b* for pressure relief valve, removal and installation.

e. Refer to paragraph 3-34*e* for fuel shutoff cock, removal and installation.

5-22. Bitumen Piping System

Refer to figure 3-15, sheet 1, for piping and three-way valve, removal and installation.

5-23. Melt Tank

Refer to figure 5-3 for melt tank, removal and installation. Repair melt tank by welding or patch welding.

Caution: **Use a hoist or lifting device with a minimum 500-pound lifting capacity when removing and installing melt tank.**

1. Clutch assembly
2. Clutch operating lever assembly
3. Cotter pin
4. Yoke pin
5. Hexagon nut
6. Lockwasher
7. Hexagon head capscrew
8. Shifting yoke
9. Lever handle
10. Lever mtg bracket
11. Collar assembly
12. Hexagon nut
13. Hexagon head capscrew
14. Shifter collar
15. Shim
16. Lube fitting
17. Flat point slotted head setscrew
18. Adjusting nut
19. Lock spring
20. Wedge sleeve
21. Clamping lever
22. Lever roller
23. Hexagon head capscrew
24. Star lockwasher
25. Driving ring coupling
26. Pilot shaft
27. Key
28. Clamping plate
29. Driving plate
30. Driving ring
31. Cup point hollow head setscrew
32 Hub

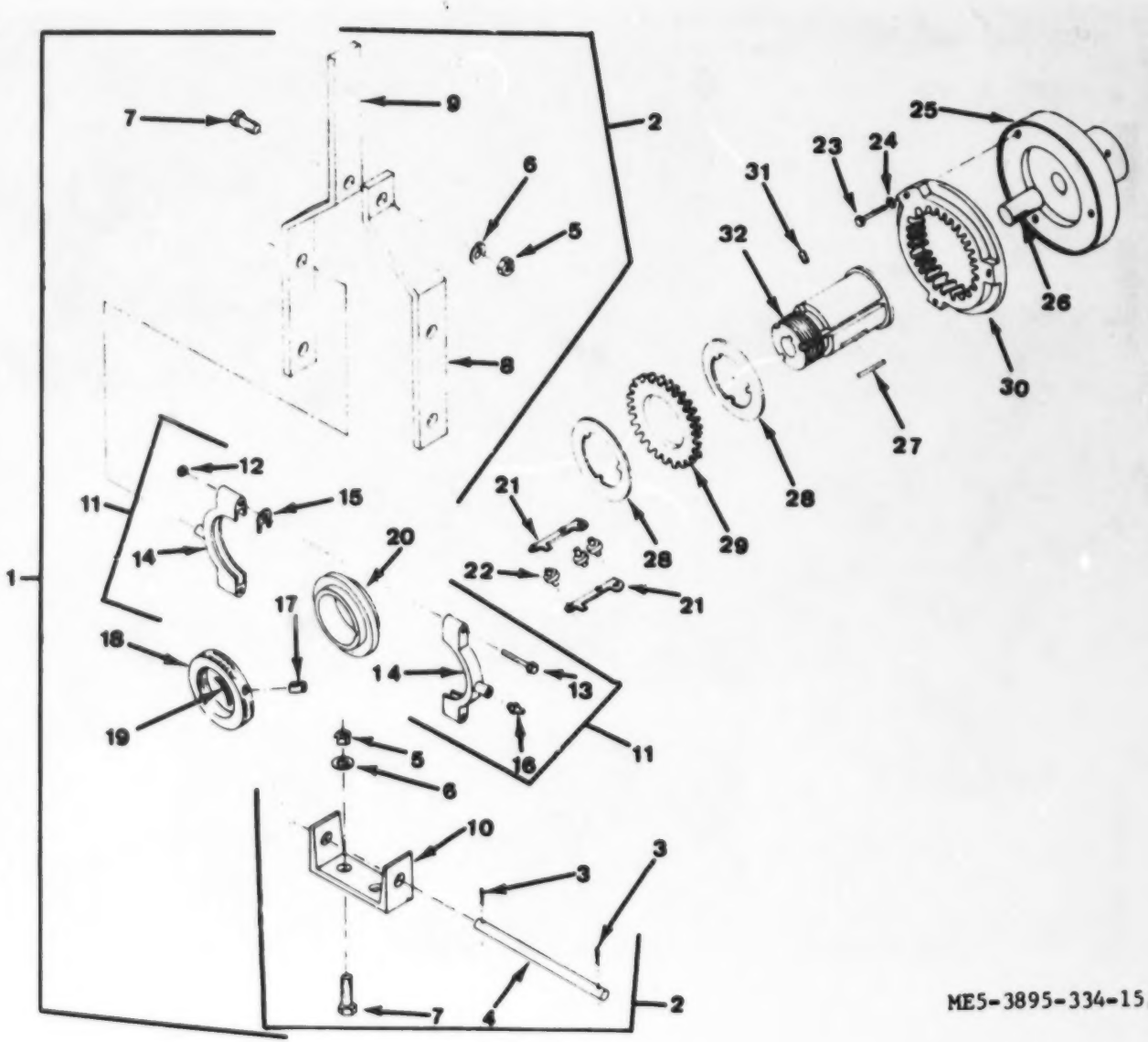


Figure 5-2. Clutch, assembly and disassembly.

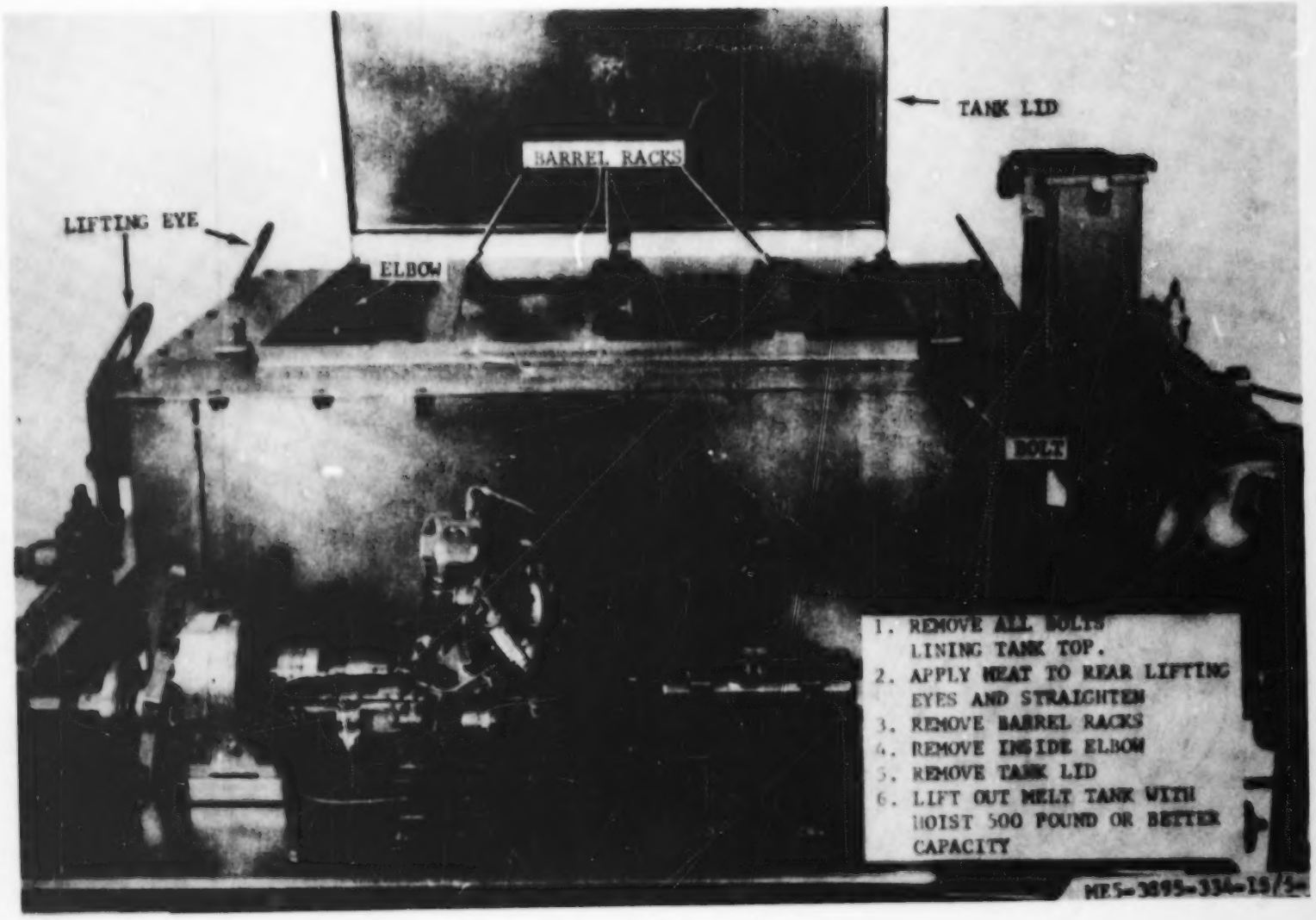

TANK LID
BARREL RACKS
LIFTING EYE
ELBOW
BOLT
1. REMOVE ALL BOLTS LINING TANK TOP.
2. APPLY HEAT TO REAR LIFTING EYES AND STRAIGHTEN
3. REMOVE BARREL RACKS
4. REMOVE INSIDE ELBOW
5. REMOVE TANK LID
6. LIFT OUT MELT TANK WITH HOIST 500 POUND OR BETTER CAPACITY

Figure 5-3. Melt tank, removal.

APPENDIX A
REFERENCES

A-1. Fire Protection

TB 5-4200-200-10	Hand Portable Fire Extinguishers for Army Users

A-2. Lubrication

C9100-IL	Fuels, Lubricants, Oils and Waxes
LO 5-2805-256-12	Military Standard Engine Lubrication Order
LO 5-3895-334-12	Bituminous Kettle Lubrication Order

A-3. Painting

TM 9-213	Painting Instructions for Field Use

A-4. Maintenance

TM 9-1870-1	Care and Maintenance of Pneumatic Tires
TM 38-750	Army Equipment Record Procedures
TM 5-2805-256-14	Operator, Organizational, DS and GS Maintenance Manual, Military Standard Engine
TM 5-2805-256-24P	Organizational, DS and GS Maintenance Repair Parts and Special Tools Lists, Military Standard Engine
TM 5-3895-334-25P	Organizational, DS, GS, and Depot Maintenance Repair Parts and Special Tools List, Kettle, Heating, Bituminous

A-5. Shipment and Storage

TM 740-90-1	Administrative Storage of USAMEC Mechanical Equipment
TM 750-244-3	Procedures for Destruction of Equipment to Prevent Enemy Use

APPENDIX B
BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

B-1. Scope

This appendix lists items which accompany the bituminous kettle or are required for installation, operation, or operator's maintenance.

B-2. General

This basic issue items list is divided into the following sections:

a. Basic Issue Items — Section II. A list of items which accompany the bituminous kettle and are required by the operator/crew for installation, operation, or maintenance.

b. Maintenance and Operating Supplies — Section III. A listing of maintenance and operating supplies required for initial operation.

B-3. Explanation of Columns

The following provides an explanation of columns in the tabular list of Basic Issue Items, Section II.

a. Source, Maintenance, and Recoverability Codes (SMR):

(1) Source code, indicates the listed item. Source codes are:

Code	Explanation
P	Repair parts which are stocked in or supplied from the GSA/DSA or Army supply system, and authorized for use at indicated maintenance categories.
P2	Repair parts which are procured and stocked for insurance purposes because the combat or military essentiality of the end item dictates that a minimum quantity be available in the supply system.
M	Repair parts which are not procured or stocked, but are to be manufactured in indicated maintenance levels.
A	Assemblies which are not procured or stocked as such, but are made up of two or more units. Such component units carry individual stock numbers and descriptions, are procured and stocked separately and can be assembled to form the required assembly at indicated maintenance categories.
X	Parts and assemblies which are not procured or stocked and the mortality of which normally is below that of the applicable end item or component. The failure of such part or assembly should result in retirement of the end item from the supply system.
X1	Repair parts which are not procured or stocked. The requirement for such items will be filled by use of the next higher assembly or component.
X2	Repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain same through cannibalization. Where such repair parts are not obtainable through cannibalization, requirements will be requisitioned, with accompanying justification, through normal supply channels.
G-	Major assemblies that are procured with PEMA funds for initial issue only as exchange assemblies at DSU and GSU level. These assemblies will not be stocked above DS and GS level or returned to depot supply level.

(2) Maintenance code indicates the lowest category of maintenance authorized to install the listed item. The maintenance level code is:

Code	Explanation
C	Operator/crew

(3) Recoverability code, indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are expendable. Recoverability codes are:

Code	Explanation
R	Applied to Repair parts (assemblies and components) which are considered economically repairable at direct and general support maintenance levels. When the maintenance capability to repair these items does not exist, they are normally disposed of at the GS level. When supply considerations dictate, some of these repair parts may be listed for automatic return to supply for depot level repair as set forth in AR 710-50. When so listed, they will be replaced by supply on an exchange basis.
S	Repair parts and assemblies which are economically repairable at DSU and GSU activities and which normally are furnished by supply on an exchange basis. When items are determined by a GSU to be uneconomically repairable they will be evacuated to a depot for evaluation and analysis before final disposition.
T	High dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts are normally repaired or overhauled at depot maintenance activities.
U	Repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, or high dollar value reusable casings or castings.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the Federal item name and any additional description of the item required. The abbreviation "w/e", when used as a part of the nomenclature, indicates the Federal stock number includes all armament, equipment, accessories, and repair parts issued with the item. A part number of other reference number is followed by the applicable five-digit Federal supply code for manufacturers, in parenthesis. Repair parts quantities included in kits, sets, and assemblies are shown in front of the repair part name.

d. Unit of Measure (U/M). A 2 character alphabetic abbreviation indicating the amount or quantity of

the item upon which the allowances are based, e.g., st, ea, pr, etc.

e. Quantity Incorporated in Unit. This column indicates the quantity of the item used in the assembly group. A "V" appearing in this column in lieu of a quantity indicates that a definite quantity cannot be indicated (e.g., shims, spacers, etc.).

f. Quantity Furnished With Equipment. This column indicates the quantity of an item furnished with the equipment.

g. Illustration. This column is divided as follows:

(1) *Figure Number.* Indicates the figure number of the illustration in which the item is shown.

(2) *Item Number.* Indicates the callout number used to reference the item in the illustration.

B-4. Explanation of Columns in the Tabular List of Maintenance and Operating Supplies—Section III

a. Component Application. This column identified the component application of each maintenance or operating supply item.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the item name and brief description.

d. Quantity Required for Initial Operation. This column indicates the quantity of each maintenance or operating supply item required for initial operation of the equipment.

e. Quantity Required for 8 Hours' Operation. This column indicates the estimated quantities required for an average 8 hours of operation.

f. Notes. This column indicates informative notes keyed to data appearing in a preceding column.

B-5. Federal Supply Code for Manufacturers

Code	*Manufacturer*
03742	Midwest Tank and Mfg. Co.

Section II. BASIC ISSUE ITEMS

(1) SMR code	(2) Federal stock No.	(3) Description Ref No. & Mfr code Usable on code	(4) Unit of meas	(5) Qty inc in unit	(6) Qty furn with equip	(7) Illustration (A) fig No.	(7) Illustration (B) Item No.
PC		DA TECHNICAL MANUAL TM 5-3895-334-15	EA		1		
PC		DA TECHNICAL MANUAL TM 5-2805-256-14	EA		1		
PC		DA LUBRICATION ORDER LO 5-2805-256-12	EA		1		
PC		DA LUBRICATION ORDER LO 5-3895-334-12	EA		1		
PC	7510-889-3494	Binder, looseleaf	EA		1		
PC	7520-559-9618	Case, manual	EA		1		
PC	8415-427-5003	Gloves, cloth, asbestos	PR		1		
PC	5120-262-8486	Wrench, bung removal	EA		1		
PC	5120-264-3793	Wrench, auto, adjustable	EA		1		
PC	5120-277-1461	Wrench, pipe, 18-inch	EA		1		
PC		Cleaner, jet burner TK-002 (03742)	EA		1		
PC		Torch, burner lighter TK-166B (03742)	EA		1		

Section III. MAINTENANCE AND OPERATING SUPPLIES

(1) Component application	(2) Federal Stock number	(3) Description	(4) Quantity required f/initial operation	(5) Quantity required f/8 hrs operation	(6) Notes
For Engine lubrication, see LO 5-2805-256-12					(1) See C9100-IL for additional data and requisitioning procedure.
Fuel Tank Engine	9130-160-1818(1)	FUEL, GASOLINE: Automotive: Bulk as follows: 91A Grade	1½ gal	6 gal (3)	(2) See current LO for graded application and replenishment intervals.
Fuel Tank Burner	9140-286-5288(2)	DIESEL FUEL: 55-gal drum as follows: DF-1	20 gal	40 gal (4)	(3) Average fuel consumption is 0.75 gal per hour of continuous operation.
Gear Reducer		OIL, LUBRICATING: 1-qt can as follows:			
	9150-265-9433	OE-30	6/8 qt	(2)	(4) Burner tank average fuel consumption is 5 gal per hour of continuous operation.
	9150-265-9425	OE-10	6/8 qt	(2)	
Grease Points		GREASE, AUTOMOTIVE AND ARTILLERY: 1-lb can as follows:			
	9150-190-0904(2)	GAA			
Valves		GREASE, PLUG VALVE			
	9150-261-8287(2)	¼-in. dia stick	1 box	(2)	

APPENDIX C
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

C-1. General

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the special tools and test equipment required for each maintenance function as referenced from section II.

d. Section IV contains supplemental instructions, explanatory notes and/or illustrations required for a particular maintenance function.

C-2. Explanation of Columns in Section II

a. Group Number, Column (1). The assembly group is a numerical group assigned to each assembly in a top-down breakdown sequence. The applicable assembly groups are listed on the MAC (Maintenance Allocation Chart) in disassembly sequence beginning with the first assembly removed in a top-down disassembly sequence.

b. Assembly Group, Column (2). This column contains a brief description of the components of each assembly group.

c. Maintenance Functions, Column (3). This column lists the various maintenance functions (A through K) and indicates the lowest maintenance category authorized to perform these functions. The symbol designations for the various maintenance categories are as follows:

C — Operator or crew
O — Organizational maintenance
F — Direct support maintenance
H — General support maintenance
D — Depot maintenance

The maintenance functions are defined as follows:

A — Inspect. To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

B — Test. To verify serviceability and to detect electrical or mechanical failure by use of test equipment.

C — Service. To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

D — Adjust. To rectify to the extent necessary to bring into proper operating range.

E — Aline. To adjust specified variable elements of an item to bring to optimum performance.

F — Calibrate. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being being compared with the certified standard.

G — Install. To set up for use in an operational environment such as an emplacement, site, or vehicle.

H — Replace. To replace unserviceable items with serviceable like items.

I — Repair. Those maintenance operations necessary to restore an item to serviceable condition through correction of material damage or a specific failure. Repair may be accomplished at each category of maintenance.

J — Overhaul. Normally, the highest degree of maintenance performed by the Army in order to minimize time work in process is consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage, or zero hour condition.

K — Rebuild. The highest degree of materiel maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero the hours or miles the equipment, or component thereof, has been in use.

d. Tools and Equipment, Column (4). This column is provided for referencing by code the special tools and test equipment (sec. III) required to perform the

maintenance functions (sec. II).

e. Remarks, Column (5). This column is provided for referencing by code the remarks (sec. IV) pertinent to the maintenance functions.

C-3. Explanation of Columns in Section III

a. Reference Code. This column consists of a number and a letter separated by a dash. The number references the T&TE requirements column on the MAC. The letter represents the specific maintenance function the item is to be used with. The letter is representative of columns A through K on the MAC.

b. Maintenance Category. This column shows the lowest level of maintenance authorized to use the special tool or test equipment.

c. Nomenclature. This column lists the name or identification of the tool or test equipment.

d. Tool Number. This column lists the manufacturer's code and part number, or Federal stock number of tools and test equipment.

C-4. Explanation of Columns in Section IV

a. Reference Code. This column consists of two letters separated by a dash, both of which are references to section II. The first letter references column (5) and the second letter references a maintenance function, column (3), A through K.

b. Remarks. This column lists information pertinent to the maintenance function being performed, as indicated on the MAC, section II.

Section II. MAINTENANCE ALLOCATION CHART

(1) Group No.	(2) Functional group	(3) Maintenance functions A Inspect	B Test	C Service	D Adjust	E Align	F Calibrate	G Install	H Replace	I Repair	J Overhaul	K Rebuild	(4) Tools and equipment	(5) Remarks
01	ENGINE													
0100	Engine Assembly													
	Engine, gasoline	C	O	C	C				O	F				A
03	FUEL SYSTEM													
0306	Tank, Lines, Fittings													
	Cap, fuel tank	C							C					
	Lines, fuel	C							O					
0309	Fuel Filters	C							O					
06	ELECTRICAL SYSTEM													
0609	Head, Tail & Marker Lights,													
	Lamp Bulb								O					
	Lamp assembly, tail & marker	C							O					
0613	Hull or Chassis Wiring													
	Harness								O	O				
	Trailer coupling cable	C							O					
08	POWER TRANSFER													
0800	Power Transfer, AY													
	Gear reducer	C		C					O	F				
	Coupling flexible	C							O	O				
0801	Transfer Case			C										
	Gasket, housing								O					
	Input shaft													
	Bearings	F							F					
	Gaskets & seals	F							F					
	Gear, drive	F							F					
	Idle shaft	F							F					
	Bearings	F							F					
	Gasket cover plates	F							F					
	Gear idler	F							F					

(1) Group No.	(2) Functional group	(3) Maintenance functions A Inspect	B Test	C Service	D Adjust	E Align	F Calibrate	G Install	H Replace	I Repair	J Overhaul	K Rebuild	(4) Tools and equipment	(5) Remarks
	Output Shaft, Main Shaft													
	Bearings	F							F					
	Gaskets & seals	F							F					
	Gear & shaft	F							F					
13	WHEELS AND TRACKS													
1311	Wheel Assembly	C							O					
	Cup & cone bearings	O			O				O					
	Seals, grease	O							O					
1313	Tires, Tubes	C		C					O	O				
15	FRAME													
1503	Pintles and Towing Attachments													
	Safety chain													
1507	Landing Gear; Leveling Jacks				C				O					
	Pin, height adjustment								O					
16	SPRINGS & SHOCK ABSORBERS													
1601	Rear Springs	O							F					
	Bolt, shackle	O		O					O					
22	MISCELLANEOUS BODY HULL & ACCESSORY ITEMS													
2202	Mirrors, Reflectors, Personnel Heaters, Defrosters, Wipers, Air-horn, Reflector Assembly	O							O					
47	GAGES (NON-ELECTRICAL) WEIGHING & MEASURING DEVICES													
4702	Temperature Gages													
	Thermometer	C							O					
	Pressure Gages													
	Gage, pressure, dial indicating	C							O					
55	PUMPS (EXCLUDE ENGINE PUMPS)													
5500	Pump Assembly				C				O		F			
	Gasket, housing								O					
	Valve, pressure relief	C							F					
	Volute, housing								F					
5501	Packing, shaft								O					
	Nut, packing					C								
	Impeller; rotor, diaphragm Gear, driven and idler	F							F					
5507	Pump Drive Clutch													
	Clutch assembly					O			O		F			
	Cone & collar shifter				C				O					
60	STEAM BOILERS; WATER HEATERS, HEATING UNITS; BURNER													
6005	Burner Assembly	C			C					O	F			B

(1) Group No.	(2) Functional group	(3) Maintenance functions A Inspect	B Test	C Service	D Adjust	E Align	F Calibrate	G Install	H Replace	I Repair	J Overhaul	K Rebuild	(4) Tools and equipment	(5) Remarks
0007	Fuel Tank													
	Pump assembly air			C					O	O				
	Thermostat, operating & safety		O	O					O					
	Hose assembly								O					
	Regulator, pressure			O	C				O					C
	Valve, relief pressure			O					O					
	Valve, assembly, safety	C							O					
	Line, air	C							O					D
	Pipe and fittings	C							O					
	Valve, fuel shutoff			C					O					E
	Fuel tank			C					O					
	Cap assembly, fill			C					C					
73	CONCRETE & ASPHALT EQUIPMENT (Mixers; Pavers; Spreaders; Finishers, etc.)													
7317	Material Spray Bar			C					O	O				
	Coupling, quick action	C							O					
	Cock	C							O					
	Nozzle, spray			C					C					
7318	Tanks, Valves, etc.			C						F				
	Link, fusible	C							O					
	Valve, three-way Lower			C					O					
	Valve, three-way upper			C					O					
	Valve, pressure relief				O				O	O				
	Pipe and fittings	C							O					
	Shell assembly furnace									F				
	Vat, melting	O		C					H	F				
	Coupling, quick action	C							O					
	Hose, spray	C							O					

Section III. SPECIAL TOOL AND SPECIAL TEST EQUIPMENT REQUIREMENTS

Reference code	Maintenance category	Nomenclature	Tool number
	C	Cleaning Needle	TK-002 (03742)

Section IV. REMARKS

Reference code	Remarks
A-A	See TM 5-2805-256-14
A-B	See TM 5-2805-256-14
A-C	See TM 5-2805-256-14
A-D	See TM 5-2805-256-14
A-H	See TM 5-2805-256-14
A-I	See TM 5-2805-256-14
B-I	Replace coil.
C-C	Clean screen.
D-H	Fabricate and replace as necessary.
E-C	Clean screen.

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